Distance Learning: A Systems View

An Assessment and Review of the Literature

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Section 1: Introduction to Distance Learning Concepts

Introduction

Distance learning (DL), an educational model in which the student and instructor are separated by time and place, is currently the fastest growing model of domestic and international education. (Poley, 2000, p. 1) Historically, the precursor of technology-based distance learning was correspondence education, which started in Europe and the United States in the mid 19th century. (Belanger and Jordon, 2000, p. 6). Beginning in the middle of the 20th century and continuing today, television began playing a role in providing distance education courses and programs. For example, the Public Broadcasting Service (PBS) presents courses that are taken by students in over 2,000 U.S. institutions (Berlanger and Jordon, 2000, p. 6)

The continued and growing need for remote access to learning opportunities, linked with newer information systems and communication technologies, especially the use of the World Wide Web, has now pushed distance education into the center of the discussion of educational practice in higher education. In 1997-98, 91 percent of public two and four year institutions either offered or planned to offer distance learning courses in the next three years, according to a National Center for Education Statistics study released in December 1999. (U.S. Department of Education, National Center for Education Statistics, 1997-98, p. 1) According to a report by International Data Corporation, in 2002 approximately 85 percent of two and four year colleges are now offering distance education courses. Student enrollments are estimated to be over 2.2 million students, or 15 percent of all higher education students. (Heterick and Twigg, January 1, 2002, p. 2). Investment in distance education is estimated to reach $2 billion dollar by the year 2003 (Poley, 2000, p. 1).

Though the growth of DL is noted as a significant feature in the current higher education environment, educators are not of one mind about distance learning. Some welcome the opportunity to expand access to higher education to lifelong learners not well served by traditional courses offered on-site (Dickinson, 2001, p. 2). Others welcome the chance to enrich education for distant students by leveraging technology to create a new, active, student-centered learning experience. The key factor is establishing the right mix of teaching modalities that includes instructor-led teaching, as well as computer and multimedia based learning opportunities (Galimi and Furlonger, 1999, p. 3).

Some educators express concern that the quality of education for students declines in the distance learning environment (National Education Association, June 2000, p. 42). Weigel (2002) suggests that "distance education in its current incarnation has been accorded the status of second best" (p. 45). He suggests that the emphasis on the convenience of DL reinforces its second-class status. "The language of convenience often functions as a subtle cue to lower expectations for a particular experience" (Weigel, 2002, p. 45).

Some teachers lack a coherent understanding of distance education practice and the full range of instructional design possibilities available to them in a distance learning environment to achieve desired outcomes (Instructional Design for Interactive Distance Learning, 1997). Some major DL initiatives emphasize educational issues only when related to fiscal

implications (i.e. cost savings) of distance education efforts (Andrew W. Mellon Foundation, 1998, Twigg, 1999, Taylor, Parker, and Tebeaux, 2001, Robinson, 2001, Rivard, 2001, Morgan, 2001).

Educators have an unprecedented opportunity to provide leadership and direction in helping to make sense of the confused DL environment. The challenge is to appropriately respond to DL driven educational changes that Armstrong has called both "sustaining" and "disruptive," by explaining and anticipating distance education practices for a broad range of emerging educational purposes and experiences (Armstrong, 2000).

Conceptual framework for DL

Conceptually, this analysis will examine the higher education environment within which DL functions. Balridge and Deal (1983), cited in Hanna (1998, p, 3), suggest that to understand opportunities for change in higher education institutions, one must understand both the internal and external environment that impacts them. The internal environment of higher education can be characterized as one that is oriented toward maintaining long-term stability. (Levy, n.d.) "Of the 75 institutions founded before 1520 A.D. which are still doing much the same things in much the same places, about 60 are universities" (Kerr, 2001, quoted in Rangaswamy, 2000). Higher education institutions are also characterized by conservatism and resistance to change. They respond slowly to the need to adapt to new imperatives. "Educational institutions in general which exist to open minds and challenge established doctrine are themselves extremely resistant to change" (Uys and Siverts, n.d. p. 3). Instead they rely on limited experimentation with peripheral activities, process and functions when confronted with the need to change (Dubois, 1999, p. 1).

The public perception and expectation about what goes on inside higher education has not changed either. These perceptions still largely revolve around the spatially located collegiate experience with c*loseness* to faculty and fellow students being at its core (Haywood, 1999).

The external environment, on the other hand, can be described as a world in which the pace and complexity of change are overwhelming, and in which boundaries of time, geography and language no longer exist (Somerville and Mroz, 1997). A significant driver for change is technology itself. Morrison and Oblinger point out that access to technology challenges people's assumptions about what it means to be educated by changing the perception of the ways in which learning can take place and the ways in which the learning process is conceived (Morrison and Oblinger, 2002).

Potential students are another significant force for change. Educators are no longer dealing only with traditional students in terms of goals, age and residential status. Many students have extremely focused work related goals (some not aiming to obtain a degree), are older, and are not interested in a residential experience. As a result of changing student perceptions, institutions must respond to an increasing diverse set of expectations (Morrison and Oblinger, 2002).

Toffler (1985), as cited by Hanna (1998), suggests that the stability-oriented internal environment of developed organizations like colleges and universities will change significantly only when three conditions are met "First, there must be enormous external pressures. Second, there must be people inside who are strongly dissatisfied with the existing order. And third, there must be a coherent alternative embodied in a plan, a model or a vision" (Hanna, 1998, p. 3). The first two conditions can certainly describe higher education. The third of these conditions is the focus of this paper. It responds to the call made thirty years ago by Moore (1973, p. 661; quoted in Keegan, 1996, p. 10):

> As we continue to develop various non-traditional methods of reaching the growing numbers of people who cannot, or will not, attend conventional institutions but who choose to learn apart from their teachers, we should direct some of our resources to the macro factors [sic]:
>
> - Describing and defining the field
> - Discriminating between the various components of the field
> - Identifying the critical elements of the various forms of teaching and learning
> - Building a theoretical framework which will embrace this whole area of education.

Describing and Defining the Field

Distance or distributed learning (DL) encompasses essentially all learning technologies, including "postal distribution, video broadcast, CD-ROM and Web delivery" in which "instruction and learning interactions may take place independent of the relative physical locations of the individual participants" (Lundy, et al. 2002, p.1). This definition may seem straightforward enough, but conceptual confusion is continually created with the advent of new terminology (i.e., distance learning, distributed learning, open learning, e-learning, flexible learning, learning portal and virtual classrooms). (Garrison, 2000, p. 1) Figure 1 provides definitions for some of the terms found in the literature.

In addition, DL borrows and leverages terminology from other disciplines, including psychology, sociology, philosophy, history, economics, organizational theory, adult education, general education and information technology (Lundy, et al. 2002, p.1). Thus, this review of distance learning must begin with an understanding of key concepts related to distance learning, including processes, technologies and capabilities.

The Discipline of Distance Learning

Some theorists have proposed that distance education can be considered a discipline in its own right with its own vocabulary (Coldeway, 1989). Holmberg (1986) has examined the grounds for regarding the study of distance education as an emerging discipline. He reviews over 300 studies and concludes that "there is in fact a discipline of distance education, which can be described both in terms of [unique] research programs and in terms of curricula for university study (Holmberg, 1986, p. 4). Others have hesitated to speak of a 'discipline' *per se,* but rather view distance education as a "coherent and distinct field of educational endeavor" (Keegan 1996, p. 6). Devlin describes distance education as a derivative field of

adult education, which in itself is a "professionalizing vocation," not a discipline in its own right (Devlin, 1989). Still others choose to refer to simply the 'field' of distance education based on the view that "it lacks autonomy and independence from education," (Rumble, 1988, p. 1) and that "there is nothing uniquely associated with distance education in terms of its aims, conduct, students or activities that need affect what we regard as education" (Garrison 1989, p. 8, quoted in Hutton, 1998).

Figure 1 Definition for Some Distance Education and Training Terms

Term	Definition	Source
Asynchronous learning (sometimes referred to as Networked learning)	"A type of learning in which learners and instructors use computers to exchange messages, engage in dialogue and access resources" any time and any place.	Commonwealth of Learning, 2000. Schocken, 2001.
Distance education	"Planned learning that normally occurs in a different place from teaching and as a result requires special techniques of course design, special instructional techniques, and special methods of communication by electronic and other technology, as well as special organizational and administrative arrangements."	Moore and Kearsley, 1996
Distance learning	"Instruction and learning practice utilizing technology and involving students and teachers who are separated by time and space."	Majdalany and Guiney, 1999
Distributed learning	"Learning environment [which] exists among a dispersed student population, is structured according to learner needs, and tends to integrate traditional institutional functions (e.g. classroom and library)…through both synchronous and asynchronous communication."	Oblinger and Maruyama, 1996
E-learning	"Can be s subset of DL [distributed learning]. Relies on digital content, experiences through a technology interface, and is network-enabled. Collaboration is a desirable feature of e-learning…"	Lundy, Harris, Igou, and Zastrocky, 2002
Open learning	"An arrangement in which learners work primarily from self-instruction, completing courses structured around specially prepared, printed teaching materials, supplemented with face-to-face tutorials and examinations."	William, Paprock, Covington, 1999

Despite differences in orientation, there is agreement that the definitive characteristic of distance education is the quasi-permanent separation of teacher and learner through the

length of the learning process and it is this condition that provides a basis for inquiry (William, Paprock, Covington, 1999, p. 2) Additional characteristics of distance learning discussed in the literature include(Keegan, 1986):

1. The influence of an educational organization both in planning and preparation of learning materials and in the provision of student support services. This characteristic distinguishes DL from private study and teaches-you programs.
2. The use of technical media, print, audio, video or computer to unite teaching and learner and carry the content of the course.
3. The provision of two-way communication so that the student may benefit or even initiate dialogue. This characteristic distinguishes DL from other uses of technology in education.
4. The quasi-permanent separation of the learning group throughout the length of the learning so that people are usually taught as individuals and not in groups, with the possibility of occasional meeting for both didactic and socialization purposes

Verduin and Clark (1991) have done further analysis of definitions of DL and have identified four elements common to all distance learning experiences:

1. The separation of teacher and learner during at least a majority of the instructional process.
2. The influence of an educational organization, including the provision of student evaluation.
3. The use of educational media to unite teacher and learner and carry course content.
4. The provision of two-way communication between teacher, or mentor, or educational agency and learner.

Globalization has inspired additional ways of looking at distance education. Shale (1987) uses the term open learning to describe a way of looking at DL in international higher education. Wedemeyer (1975), one of the early theorists in the open learning field, describes the basic principle that characterizes the open university concept:

> Learning is the act or process of acquiring knowledge or skill. When the adjective "open" is used to qualify "learning" we have put a name to a process of learning that is not enclosed or encumbered by barriers, that is accessible and available, not confined or concealed and that implies a continuum of access and opportunity…The ideal concept of open education would take the form of *education permanente*, open to all people at all levels, cradle-to-grave (Wedemeyer, 1975, p. 125 as quoted in Shale, 1987, p 2).

The core concept inherent in "openness" is the idea of extending access to educational opportunity, and this may be done in many ways. For example:

1. The provision of more "seats" at the university level.
2. The usual entrance requirements for admission to a university program may be eased or waived.

3. The constraints of having to be at a particular place at a particular time may be alleviated or waived completely.
4. "Substantial" credit may be awarded for life-experience or for university credit taken at other institutions.
5. Credits earned through study elsewhere may be 'banked" and perhaps combined with life-experience credit, to be applied to a degree at a host university.
6. Students study independently and at a pace of their own choosing. (Shale, 1987, p. 3)

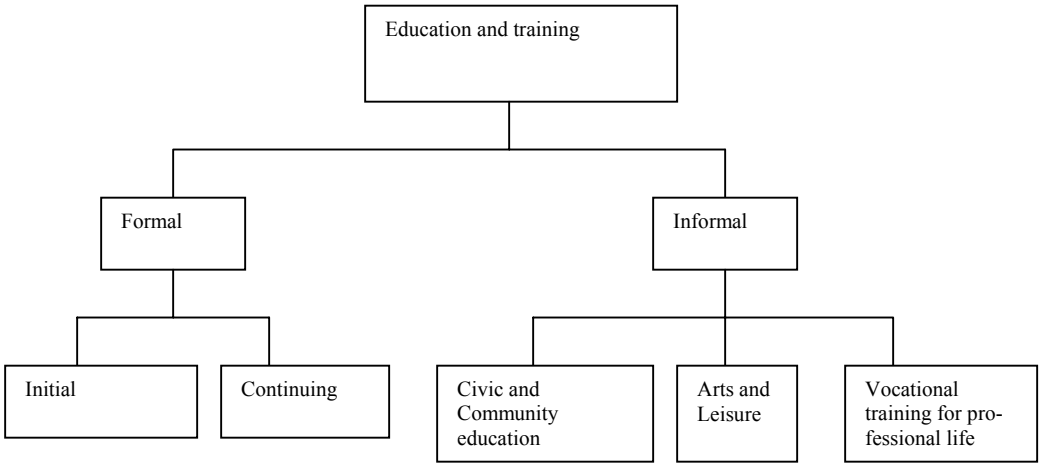
Given that there are many different contexts for education and training, all of which may have their distance learning and/or open learning components, supported by specific technologies, Trindade, Carmo and Bidarra (2000) have joined distance learning and open learning into one model which they call *open and distance learning (ODL) systems* (p. 3). "The term open and distance learning provides an umbrella designation for all kinds of systems fitting the above characteristics" (Trindade, 1992, quoted in Trindade, Carmo and Bidarra, 2002, p. 3). An abridged version of their inclusive educational model is presented in Figure 2 below.

While open and distance learning as a merged concept is appealing, this paper will continue to use the phrase distance or distributed learning (DL) to reference various forms of mediated teaching and learning, characterized by the dispersion in time, space or both of learners and their instructors for the whole or parts of programs. "The distinction between distance learning and open learning has been that as it evolved, distance learning incorporated technological advances into the teaching/learning process, whereas open learning did not necessarily do the same" (William, Paprock, Covington, 1999, p. 2) The growth of "open" universities, most of which offer education at a distance, has not helped to clarify the distinction between the two. The term *open* generally refers to institutions, such as the British Open University and many American community colleges, which have open admission policies. An open admissions policy is not necessarily a characteristic of distance learning programs. A survey reported by Williams, Paprock and Covington (1999) shows that in a United Nations database of distance learning programs, only 22 percent of 859 distance learning programs had open admission policies (p. 3).

Discriminating between the various components of the DL field

It is the case that distance learning is continuing to evolve toward greater conceptual complexity, particularly in relation to the variety, power and flexibility of *delivery systems* to respond to the variety of learning environments highlighted above. These include print, correspondence, radio, television, fax, audio and video cassettes, CD-ROMS, DVD's, telephone, one-to-one videoconferencing, teaching aids (such as photographic slides and experimental kits for use in the home), and computers (used to undertake computing as a general tool for word processing and spreadsheets, for electronic mail and computer conferencing and in computer assisted learning/computer aided instruction). Technological development is increasing the range of such media and increasing the way in which media can be combined. For example, content management software on the web can be used to post syllabuses in combination with a synchronously delivered course via room videoconferencing (Rumble, 1992). (A more detailed discussion of technologies will be presented later in this paper.)

Figure 2: Different types of DL and Open Education and Training Situations and Connections between Various Types



Adapted from Trindade, Carmo, and Bidarra, 2000, p. 2

In addition, definitions of DL exist which emphasize the *process* of educational delivery. Definitions that focus on process characterize distance learning as a transaction between teacher and learner based on dialogue and structure. Moore (1973) proposes the concept of transactional distance as the key element in distance education. Transactional distance is a "distance of understandings and perceptions [not of geography] that may lead to a communication gap or a psychological distance between participants in the teaching-learning situation" (Chen and Willits, 1998). As a continuous variable, the magnitude of transactional distance is dependent upon "dialogue"-- the potential for communication between learner and instructor, and "structure" -- the degree to which a learning program can be individualized for specific learner needs (Moore, 1993). Moore argues that the degree of transactional distance between learners and teachers and among learners is a function of the extent of the dialogue or interaction that occurs, the rigidity of the course structure, and the extent of the learner's autonomy (Chen and Willits, 1998). Moore argues that transactional distance and learner autonomy are directly related. Learners operating at greater transactional distances need more autonomy (Muth and Guzman, 2000, p. 2). Moore defines learner autonomy as "the extent to which in the teaching/learning relationship it is the learner rather than the teacher who determines the goals, the learning experiences, and the evaluation decisions of the learning program (Moore, 1993, p. 31).

Identifying the critical elements in the various forms of teaching and learning in a DL environment

Ryan (2001) shows that two models of learner support now exist in the DL environment: one related to development of the individual's potential and another related more to the needs of

the system for accountability. She points to technology's ability to focus on "learner-centeredness." "Whereas Dewey conceived of the teacher manipulating the learner's environment and resources in order to stimulate the individual," the distance learner now is seen to be independent of the teacher, who is no longer "a directive expert or 'sage on the stage,' but a facilitator or 'guide on the side' " (Ryan, 2001, p. 73).

Some critics of distance learning consider the individualistic model of learning described above as having serious defects.

> For Dewey, a highly individualistic, or libertarian model of learning severely narrows and restricts the meaning and practical effects of education's social function. In his view, the purposes of education in a democracy are necessarily both individual and collective in nature. They consist in developing individuals' natural capacities and acquisition of skills in concert with their preparation for the activities of engaged citizenship and reflective thought. (Brint, 2002, p. 4).

Many who analyze the impact of DL on teaching and learning would instead agree with Twigg and Jurich, who state "greater quality means greater individualization of learning experiences for students. This means moving away from teaching and learning ideas that begin with the thought that 'all students need…' "(Twigg, 2001, p. 9), and focusing instead on "learner-centered, technology-based forms of learning…" (Jurich, 2000, p. 4).

Other important contributors to a conceptual analysis of teaching and learning in the DL field includes Wedemeyer, who as early as 1971, began to identify the defining characteristics of distance learning, including communication, pacing, convenience, and self determination of goals and activities by the learner (Garrison, 2000, p. 5). Peters (1994) considers the structure of distance education, noting the possibility of adopting industrial production techniques such as division of labor, mass production and organization to realize economies of scale and reduce unit costs (Garrison, 2000, p. 5-7). Holmberg (1989) has developed the concept of "guided didactic conversation…. as the "pervasive characteristic of distance education." In essence his theory presents the view of distance education as "friendly conversation [fostered by] well developed self-instructional materials [resulting in] feelings of personal relation…intellectual pleasure [and] study motivation"(Garrison, 2000, p. 8).

Other major theorists include Garrison and Shale (1990), who place the teaching and learning transaction at the core of distance learning practice (Garrison, 2000, p. 9). A collaborative education perspective is offered by Henri (1992), and includes five educational dimensions: participation, interaction, social, cognitive, and metacognitive (Garrison, 2000, p. 10).

In spite of the large range of theoretical research on teaching and learning in the DL environment cited here and elsewhere (see Muth and Guzman, 2000, and Garrison, 2000, for comprehensive reviews) the DL field lacks a record of empirical research to support its theoretical models and to provide a framework for the field (Willis, 1988, Saba, 2000). Most research focuses on: 1) descriptions of various programs and institutions [a recent 10-year survey of distance education research points out that three-fourths of the 890 articles and dissertations reviewed between 1990 to 1999 involved descriptive research (Berge and

Mrozowski, 2001, p. 11-12)]; 2) audience studies, including the performance of students; 3) cost effectiveness studies; 4) methodology, descriptive of the various methods used to teach, support and counsel students; and 5) social context, examining the social context of distance learning (Perraton, 2000, p. 4-5). Research questions are rarely posed within a theoretical framework or based on fundamental concepts and constructs, making it difficult to draw any general conclusions or consensus about the nature of the field (Saba, June 2000, p. 3, McIsaac and Gunawardena, 2001). As a result, there is a shortage of well-founded research findings on many aspects of distance learning, while findings about its context, critical for policy makers, are especially scarce (Perraton, 2000, p. 5).

Shale (1990, as cited in McIsaac and Gunawardena, 2001) calls for theoreticians and practitioners to stop emphasizing points of difference between distance and traditional education, but instead to identify common educational problems. Distance education, is "after all, simply education at a distance with common frameworks, common conceptual concerns, and similar research questions relating to the social process of teaching and learning" (McIsaac and Gunawarden, p. 408). As "hybrid" teaching (the replacing of some in-person meetings with virtual sessions) starts to blur the distinction between traditional and online instruction (Young, March 22, 2002), the differences between DL and traditional teaching are becoming less distinct. The need for separate discussions about educational practice in the distance learning environment will lessen as convergence of distance education, distributed learning and traditional instruction occurs (Otte, March 18, 2002).

Building a theoretical framework

While convergence in practice is taking place, there are those that still believe that a theoretical justification of distance education as a separate discipline and practice is needed (Keegan, 1996, p.116). McIsaac and Gunawardena (2001) summarize three approaches to theory building that have helped to fill in the "theoretical void." First, a multi-disciplinary and interdisciplinary approach to DL is identified. This approach encourages a broad view, utilizing insights from the humanities and social sciences to provide an academic perspective on the DL environment (see von Baalen and Bjorn, 2000). Second, they identify research related to adult learning as providing a unique educational perspective in the DL field (see Einarsson and Gard, 2000). Third, they discuss an international perspective (see Rumble, 1992), pointing out that certain lines of questioning are more appropriate in some countries than others due to differing environmental circumstances and needs of potential students.

McIsaac and Gunawardena (2001) point out that though these three approaches to theory building have advanced conceptual thinking about distance learning, more work is needed. They suggest a critical approach which integrates theories from all three perspectives in order to enrich theory building in the distance learning field.

Systems theory

The open systems approach can provide the fundamental context for the critical study of DL because of its potential value in "synthesizing and analyzing complexity" (Simon, 1968, quoted in Malhotra, 1993, p. 7). This complexity includes:

- "A large number of activities to be integrated including course design and development, production, delivery, teaching and student support;
- A variety of specialist personnel and resource inputs;
- Large numbers of students;
- New communication technologies;
- Visible and relatively permanent course materials (compared to the more ephemeral nature of face to face teaching and learning);
- Significant extra-institutional goals e.g. access and equity, national/mass education;
- Significant financial investments; and
- Significant risk."
  (Systems Approach)

Together these characteristics imply a need for coordinated management and control and integration of resources - human, physical and monetary. In complex situations, marked by the need to be flexible and adaptive, as well as an emphasis on service to clients, cost reduction, and rapid response to changing technologies, a systems approach can help assist in planning, directing, evaluating and redirecting programs and processes.

Keegan (1993) has proposed the use of systems theory to serve as a basis for systemic study of distance learning, to contribute to conceptual insights about the complexities of distance education, and to provide the basis for developing methods for enhancing the teaching-learning environment. An open system is a distinct entity that takes in resources from its environment, processes them in some way, and produces output. The components of the open system are relationally arranged and interdependent "in order to attain its specified purpose" (Benathy, 1992, p. 191, as quoted in Cookson, 2000, p. 2). A systems approach looks both inward and outward, focusing on relationships and patterns of interaction between subsystems and their environments within the organization. In this context, terms such as input, process, output, control and feedback are frequently used for describing, analyzing, and evaluating our institutions. These tools can be applied to any level and to any function in an institution.

How does distance education fit this model?

Austin (n.d.) cites Keegan (1993) in viewing distance education as a multidimensional system of learning and communication processes, with the aid of an artificial signal carrier (Austin, p. 250). He also points to Saba (2000) in stating: "a systems approach is necessary to describe distance education and define a set of prescriptive principles and rules for its effective use, as well as a set of criteria to determine its effectiveness."

Distance education may be conceptualized and analyzed from a systems perspective because it is made up a complex set of interdependent subsystems. External to a distance education program are local, state, national, and international structures that impact on offerings and delivery systems. Within the institution, there are three major subsystems: an operational system, a logistical system and a regulatory system ("Systems Approach," n.d.). Each is comprised of its own variously integrated sub-systems and sub-sub systems. For example, there is the sub-teaching/learning system. When learners come into contact with

teaching/learning materials and are supported in study, a teaching/learning system exists. The sub-sub systems which integrate to form this sub-system involve:

- A learning recruitment and admission system
- A course design and materials development system
- A teaching/mentoring system
- A student support system ("Systems Approach", n.d.)

The distance learning program takes in resources and information and processes them within these sub-systems in a variety of ways, returning a range of educational services and programs to individuals and systems in its environment. The DL program is highly dependent on resources in the environment for its success.

There are numerous examples of systems thinking in distance education. One example is the 1996 book by Moore and Kearsley in which they refer to distance education as:

> a system that consists of all the component processes that make up distance education including learning, teaching, communication, design, and management and even such less obvious components as history and institutional philosophy. Within each of these broadly named components are subsystems, which are systems in themselves. For example, there is a subsystem in every distance education system that deals with course design, one that includes many component activities working together so that the course is produced with quality, on time and at acceptable cost. The course design subsystem links to other subsystems to form the total system. While we may choose to study each of these subsystems separately, we must also try to understand their interrelationships. Anything that happens in one part of the system has an effect on the other parts of the system. So as we focus on any one part of the system, we need to hold in the back of our minds a picture of the total context. (p. 5, as quoted in Cookson, 1998, pp. 2-3)

According to Moore and Kearsley (1996), successful distance education programs must examine the whole learning experience systematically and as a collection of its interrelated systems -- the learning organization (students and faculty), instructional design systems, the delivery system, the interactions between student and instructor, and the learning environment.

Potential inputs or options are identified for each of these components (see Figure 3 below). For example, interaction is identified as potentially involving: students interacting with faculty, advisors, administrative staff, and with each other (Moore and Kearlsey, 1996, p. 11-12). Options identified for the management and administration of the distance learning system include: assessment methods, resource allocation, and policy development (Moore and Kearsley, 1996, p. 12).

The costs and complexities of understanding, implementing and managing a distance learning system justify the use of teams of specialists and a mass production model of education. Moore and Kearsley (1996) draw analogies to the modern air transportation industry, and state: "a distance education system only becomes cost effective when it can take advantage of the economies of scale" (Moore and Kearsley, 1996, p. 7).

A seminal article by Cookson (1998), utilizing previous research completed by Banathy (1992), analyzes distance education as an organizational system. Benathy described three systems models: system-environment model, the structure-function model, and the process behavior model. Cookson shows that each model provides a unique perspective for understanding the structure of distance learning as a system (Cookson, 1998, p. 3-4).

Figure 3: A Systems Model for Distance Education

Sources → ↑	Design → ↑	Delivery → ↑	Interaction → ↑	Learning Environment ↑
Student needs	Instructional Design	Print	Instructors	Workplace
Organizations	Media	Audio/Video Recordings	Tutors	Home
Theory/History	Program	Computer Software	Counselors	Classroom
Philosophy	Evaluation	Audio conferencing	Administrative Staff	Learning Center
		Videoconferencing	Other students	
		Computer Networks		

Adapted from Moore and Kearsley, 1996.

The Systems-Environmental Model

Comprehension of a system cannot be achieved without a constant study of the environment forces that impinge upon it (Katz and Kahn, 1966, as cited in Malhotra, 1993, p 1). As Dron, et al. (2000) writes, quoting Cox (1997), "what actually governs complex systems is rarely the industrial age's notion of design at all. Rather, they evolve, shaped by an interaction in which system and environment minutely adjust to each other as biological organisms evolve with ecologies" (p. 1).

To conceptualize a distance learning system in terms of its environment is to emphasize the importance of *exchange* between the distance learning program and its environment. Unfortunately, the forces that drive this exchange are not always the needs of the learners, but may be swayed by everything in the environment from government policies to university traditions (Dron, et al, 2000, p. 1).

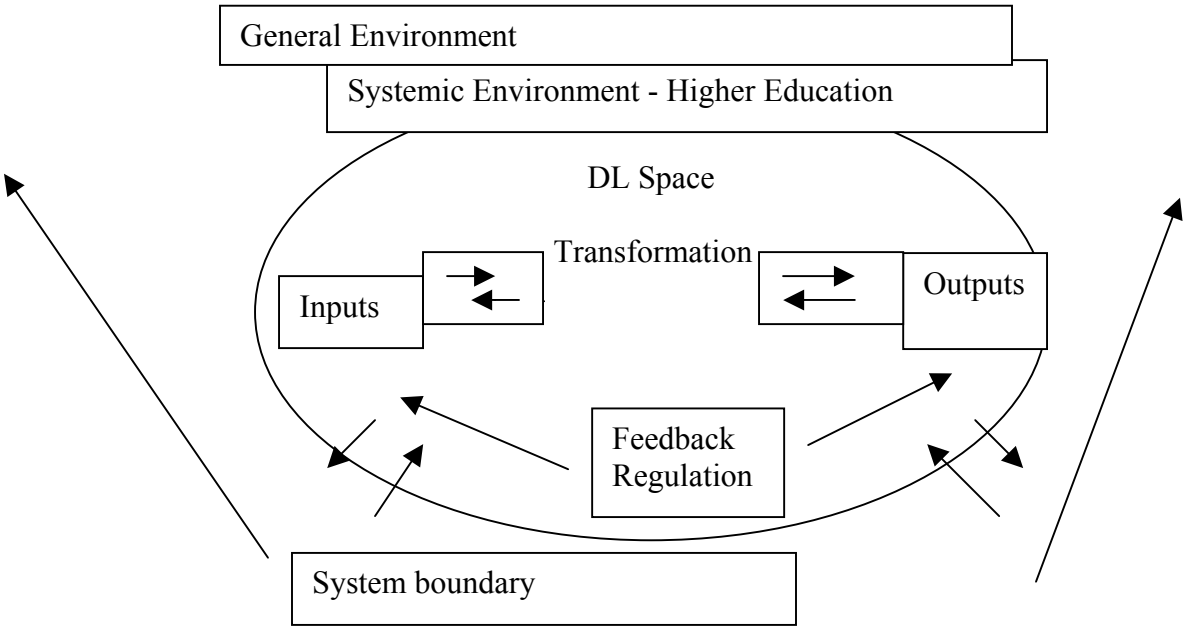
For example, distance education systems respond to financial imperatives in their environment in one basic way: by collecting tuition. These programs also depend heavily on their environment's human resources to sustain a pool of qualified instructors. In addition to being personnel intensive, distance education programs require special, potentially costly fixed assets, most notably an appropriate technical infrastructure to support course delivery.

Another vital form of input for distance learning systems is information, for example, knowledge of subject-specific and job specific-educational needs in a given community.

The most obvious output of a distance learning program is course content delivery, either synchronous or asynchronous. Another output may be supplemental educational resources distributed in various forms, which can be utilized over a longer period of time.

Less tangible outputs can also be considered. What about the effect of distributed learning on students' attitudes about learning in general? Should the long-term impact of a DL program on the economic development of a community be considered as a measure of success? The effectiveness of this kind of output is difficult, but not impossible to measure, and may help to determine how well a distance learning program is functioning as a system. By viewing a DL system in this way, we can determine the adequacy of its response to the environment, as well as the impact of the environment on the DL system. See Figure 4 below.

Figure 4: The Model of a DL Systems Environment



Adapted from Cookson, 2000, p. 2.

All distance learning systems have boundaries that define what is inside and what is outside the system. Sometimes the boundaries are imprecise and fuzzy. Fundamental to this imprecision is the idea that there is no one best way to organize. Just as with living organisms, the effectiveness of a DL organization depends on the alignment among characteristics of the system and between the system and its environment.

The systems-environmental model enables us to see distance learning in terms of interrelated and interdependent processes. This means if one component which impacts the distance education system is changed, other components are likely to change too. For example, if a communication medium is changed, this will affect the instructional design, nature of interaction, and possibly the distance learning environment itself. Other dynamics can be anticipated as well. For example, an increasingly effective distance capability might encourage a change in institutional goals from an initial focus on local students or a particular kind of course offering, to a wider range of programmatic offerings delivered to a more widely dispersed student body. Improved institutional capability in distance learning could also change institutional context by increasing the legitimacy of DL efforts within the context of university teaching and research missions.

The Functions-Structure Model

The functions-structure model depicts a system at a particular moment in time (Benathy and Jenks, 1990, as cited in Cookson, 1998). This model describes the distance education system in terms of its nature, purpose and functions, as well as how it is organized to accomplish its mission, and how the different parts are integrated. "The functions-structure model projects a still picture image that enables us to describe the educational system's goals, the functions it carries out to attain those goals, the components of the system that interact to carry out those functions, and the way those components are organized and integrated to create the structure of the system" (Benathy and Jenks, 1990, quoted in Cookson, 1998).

Application of this model to distance education involves five steps: "1) defining the system image; 2) identifying the systems definition, consisting of both purposes and systems specifications; 3) identifying the functions the system carries out; 4) determining which components of the system carry out the functions; and 5) defining the system's structure of relationships among the various parts" (Cookson, 1998).

In applying step one, distance education programs show marked image variation (Foster, 2002, p. 1). They vary in socio-political contexts, in the external infrastructure and delivery and communications capabilities available to them; in their audience; in the economic circumstance of their audience; in the significance of their role within their parent organization and externally, and in their goals. Institutions vary in the scope of their DL offerings, and the scale of their DL program. Institutions also have varied DL structures. They may be single mode institutions, i.e., offering everything by DL. The most outstanding example of this form is the Open University in Great Britain. Mixed mode institutions teach essentially the same courses by both traditional and distance delivery. Many American universities support this model. Departmental models represent those institutions that have a separately constituted department for the offering of DL opportunities. Penn State's World Campus is an example of this model. Audience targeted organizations deliver continuing professional development programs for professional clientele. Dozens of professional associations and societies provide continuing education to members in a distance learning mode. Collaborative models include the sharing of resources, technical and/or content, between institutions. The School of Library and Information Science at Kent State University represents such a shared technical model, utilizing the technical resources of Kent

State as well as those of the Ohio Public Library Information Network (OPLIN) to provide master's degree coursework in public library settings throughout Ohio. A brokerage model includes an organization that brokers the courses of other institutions. The Ohio Learning Network is an example of a brokerage model. Finally, there are a growing number of examples of institutions jointly offering a cooperatively designed course or program. Kent State University and the University of Akron are involved in one such arrangement, in developing a web-based jointly administered Ph.D. in Nursing on the web.

Kaye and Rumble (1981) focus on the problems faced by educational institutions in developing appropriate structures for their DL programs. They suggest that a major issue confronting many universities is how to resolve the conflict between distance education programs, which "often requires the management and structure of a business enterprise and traditional academic areas which have a completely different style of governance" (Jeffries, 2002, p. 6). These differences "often find expression in a conflict between academic 'freedom of action' and the necessity for maintaining effective production mechanisms" (Kaye and Rumble 1981, p 179, quoted in Jeffries, 2002), necessary for distance education course development and distribution.

In applying step two of Benathy's (1992) model, convergence between a DL production model and traditional higher education can occur. Rummler and Brache's Organizational Alignment Model (see Rummler and Brache, 1990) provides a useful framework for analyzing and aligning the goal-setting, structure and management practices of an institution, its distance education processes, and its staff members (Prestera and Moller, 2001, p. 3). An analysis matrix has been developed for this model and is shown in Figure 5.

Figure 5: Organizational Alignment Model

	Goals	**Structure**	**Management**
Organization	Cell 1 - What will DL contribute to the institution's education goals?	Cell 4 - How should we structure DL within the institution to help the institution meet its goals?	Cell 7 - How will we measure success and improve DL's ability to help the institution meet its goals?
Process	Cell 2 - What are the key success factors for delivering DL such that they meet the institution's goals?	Cell 5 - How should DL functions be structured in order to be effective and help the institution meet its goals?	Cell 8 - How will we measure the efficiency and effectiveness of DL processes?
Personnel	Cell 3 - What do we need from faculty and professional staff in order to meet our DL goals?	Cell 6 - How should roles and responsibilities be defined in order to meet expectations and deliver results?	Cell 9 - How will we measure and improve teaching and learning in the DL environment?

Adapted from Prestera and Moller, 2001

Goals

Rogers (1995) suggests that for distance education to be successful, DL options must follow and support university mission, goals and the educational needs of students. Institutions vary in their primary goals for providing distance education opportunities. These goals are established within socio-political contexts and constraints and may focus on serving those who, for a variety of reasons, cannot attend a traditional college or university (Porter and Lane, 2000). These include persons who live in geographically remote areas in which it is difficult or impossible to provide face-to-face teaching; those who suffer from physical disability or long term illness, which prevents them from coming to campus; those who have been displaced; and those who move frequently. Distance education is also suitable for those who for social, economic or educational reasons missed out on the opportunities available from traditional institutions offered at traditional times and places, or who wish to retrain or update themselves, or study for personal interest and enjoyment. A whole range of enrichment, community development and vocational education distance courses are possible for adults, including distance learning opportunities provided by firms for the delivery of training opportunities on the job.

Figure 6: Possible Balanced Scorecard Goals for Distance Education

Student Satisfaction Goals	**Improve access**: To improve access to instructional opportunities for students whose schedules and/or life or work obligations do not permit enrollment in traditional campus based programs, and/or are geographically dispersed.
	Individualized instruction: Self-paced, self-directed learning opportunities through a variety of content offerings (that utilize a variety of delivery methods) that allow for focused content selection by individuals.
	Livelong learning: To support continuous learning, sustaining experiences beyond the time and physical constraints of the classroom.
	Value: Acceptance of distance learning opportunities by both students and employers so that educational opportunities obtained at a distance are perceived as quality offerings.
	Collaboration: To provide education opportunities that encourages interaction and collaboration.
Operating Efficiency and Effectiveness Goals	**Delivery efficiency and effectiveness**: To organize, update, and distribute content efficiently and effectively through content management systems.
	Technology performance: Technology is reliable and provides sufficient bandwidth to deliver content efficiently and effectively.
	Scheduling flexibility: To provide flexibility in scheduling for faculty and students, enabling them to appropriately leverage their time for teaching and learning events.
Learning Goals	**Innovate instruction**: To offer new strategies for instruction, that can be evaluated through performance based assessment.
	Faculty development: Faculty will develop new medium-specific skills that may improve their overall teaching skills as well.
Financial Goals	**Operating costs**: Reduction of costs for course delivery over time.
	Return on investment: Large investments in technology and course development are justified by increases in enrollment and the reaching of new students who would not otherwise be enrolled.

Adapted from Prestera and Moller, 2001, p. 5-6.

Rossner-Merrill (1996) suggests that the wide variety of potential DL goals, particularly as they relate to "education on demand," marginalizes distance learning as an enterprise. She suggests that "a uniform purpose for distance education within institutional settings" needs to be established in order to put it onto "a level playing field" with other mainstream educational efforts. Most of those in the DL field would not agree. They would agree with Prestera and Moller instead, who have identified four sets of DL goals as part of what they call "a balanced approach to goal setting" (Prestera and Moller, 2001, p. 5). These are summarized in Figure 6.

As part of identifying goals and measures to be included in the balanced scorecard, those responsible for DL programs need to assess the needs of all stakeholders, including potential and existing students and their parents, faculty, administrators, and technologists, governing bodies (legislators and accrediting agencies) and potential revenue providers (i.e. alumni, donors and granting agencies.) These stakeholders reflect the need for both external accountability as well as internal assessment (Stewart and Carpenter-Hubin, 2001, p. 38). See Figure 7.

Figure 7: Externally and Internally Driven DL Assessment

Externally Driven		**Internally Driven**
Audience	Consumers Students Parents Trainees Governing bodies Legislators Accrediting agencies Revenue generators Alumni Foundations Donors Employers	Faculty Academic administrators Nonacademic administrators Technical staff
Concerns	Programs (rather than courses) at a distance Branding of degrees	Organizational agenda Resource allocation priorities
Focus	Influence choices of relevant audiences	Influence support from political coalitions and/or employers
Format	Benchmarking reports Case studies Guidelines Rankings Indices	Faculty committees Institutional reports White papers

Adapted from Stewart and Carpenter-Hubin, 2001, p. 39.

Key to using the balanced scorecard approach are the steps that link the larger goals in higher education to special problems that must be solved, decisions to be made, and resource allocation choices that present themselves in the distance learning environment. While the balanced scorecard approach cannot guarantee that correct decisions will be made, the process provides for an integrated perspective on goals, targets and measures of progress. It ties together information from a variety of perspectives so that trade-offs can be weighed.

Austin (n.d.) points out that management must be mindful of the functional interconnectedness that trade-offs imply. Improvements in one part of the distance learning environment must be accompanied by improvements in related areas and all must be monitored carefully so that gains in one part of the DL organization will not lead to the loss of benefits somewhere else.

The Process-Behavior Model

When viewed in terms of transformation processes, a distance learning system may be viewed as an entity designed to incorporate input from the environment, transform the input into output, distribute that output into the environment, and make adjustments as necessary to the changing conditions of the environment. The process behavior model takes this view, providing a dynamic focus that puts emphasis on what the system does over time (Cookson, 1998, p. 11). The key features of this model include putting the right people, systems and resources in place to succeed; evaluating results through cost/benefit analysis; providing feedback and taking action to maintain alignment with established educational, teaching and learning, and societal goals (Prestera and Moller, 2001).
The growing diversity of delivery systems coupled with the variety of teaching and learning methods supported by these various delivery systems suggests the importance of selecting the appropriate evaluation strategies to assess the effectiveness of various distance learning models. Some of the important evaluation questions include:

- What do we get out of our investments in DL?
- Is distance education better, worse than or as good as traditional education? (Tucker, 2001)
- What can we do to increase the likelihood that our DL offerings will be successful?
- Will DL allow us to increase the number of students we educate without increasing costs? (Belanger and Jordon, 2000, p 10-11)

These questions reflect two sets of important issues. First, what are the determinants of a successful DL program? And second, how do we measure success (or failure) of the program?

The questions raised here suggest that "distance education is about change" (Moore and Kearsley, 1996, p. 15). The technology is changing constantly. Educational concepts and settings are changing. Unfortunately, there is still no agreement on the value of one evaluation strategy or another as a way of measuring the effectiveness of change strategies in the distance learning environment. Educational providers are actively supporting DL as an enterprise without identifying reliable, agreed-upon effective DL models to use as benchmarks for performance -- thus making what Ash (2000) refers to as "a leap of faith" when promoting the value of DL in their institutions. She suggests that educators and

policy makers are so aware of this issue that the "not-invented-here" attitude is visible across higher education. She concludes that there is a distinct unwillingness to accept evaluation models developed by others, however similar the circumstances, as a basis for decision making.

Section 2: The Demography of Distance Education

In addition to a consideration of the appropriate systems to support the provision of DL opportunities, it is important to know who distributed learning opportunities are intended to serve. Distance education is becoming a rapidly expanding group of offerings and activities. Lifelong learning, educational flexibility and growth in student populations are among the trends feeding this expansion. However, the distance education audience is not homogeneous. "The intended audience for distributed learning can be segmented into numerous categories, ranging from traditional students seeking additional flexibility to 'recreational learners' engaged in expanding their personal knowledge" (Oblinger, et al, 2001, p. 9). A number of different characteristics can help define a learner segment:

- Age/maturity
- Motivation (e.g. earn a degree vs. recreational learning)
- Type of credential desired (e.g., degree, certificate)

Figure 8: Learner Segments in the Distance Learning Environment

Learner Segments	**Goals**
Life fulfillment learners	Interested in education for their own sake. They enjoy learning and the academic environment and view additional education as a hobby or as a source of personal development.
Professional enhance-ment learners	Seeking to advance their careers or change career direction. The decision to get further education or training is made by the employer and employee making a mutually beneficial decision and not by the individual acting alone. Job oriented learners demand a broad range of learning opportunities, from non-credit skill oriented training to full degree programs.
Degree-completion adult learners	Working to complete a degree at an older age. They are frequently working adults who must often balance work and family needs along with educational goals.
"College experience" learners (i.e. traditional age students *living on campus)*	Are preparing for their first entry into the world of professional work. This segment includes many eighteen-to-twenty-four year old residential college students for whom the "residential experience" is as important as academic learning. Time to degree completion for first degree is approximately four years.
"College experience" learners (i.e. traditional age students *living at home, moving in and out of school, and working*)	Are preparing for their first entry into the world of professional work. This segment includes many eighteen-to-twenty four year old students for whom going to college and obtaining a degree is the immediate goal, and living at home and working is a strategy to meet that goal. Time to degree completion for first degree is approximately six years.
Pre-college (post-secondary) learners	Interested in taking baccalaureate level work before completing high school. This segment may be interesting in getting a jump start on college.

Adapted from Oblinger and Kidwell, 2000, p. 34

Different learner segments suggest that alternative educational approaches may be appropriate for different groups of potential students. "The kind of program designed to serve traditional college students will be quite different from the type of program designed for corporate learners, for instance (Oblinger and Kidwell, 2000, p. 34). Figure 8 summarizes examples of learner segments.

Market forces and the development of distance education

Market forces are responsible for what is happening in a significant segment of the distance learning environment at large. "The size of the education market--pre-school, k-12, higher education and adult learning--has been pegged at $665 billion a year. … That makes the amount that America invests in lifelong learning more than the total spent on national defense…Estimates for higher education alone indicated that it is a $225 billion-a-year market" (Oblinger and Kidwell, 2000, p. 32).

The growth in DL use is supported by data in a 1988-89 survey reported by the National Center for Education Statistics (NCES) of the U.S. Department of Education. Fifty-four thousand college level, credit bearing distance learning courses were offered by 680 institutions in 1997-98 (U.S. Department of Education, National Center for Educational Statistics, 1998, cited by Eaton, 2001, p. 3). Nearly 40percent of all college classes used Internet resources as part of a syllabus in 1999; over 25 percent of courses had a Web page (Moe and Blodget, 2000, p. 170). Approximately 84 percent of four year colleges and 85percent of two year colleges are expected to offer distance learning courses in 2002 (Moe and Blodget, 2000, p. 169, Institute for Higher Education Policy, 1999, p. 1).

In Virtual College, author Pam Dixon estimates that there are currently 5 to 7 million people participating in various forms of distance learning (Dixon, 1996). The Distance Education and Training Council (DETC), which is authorized by the U.S. Department of Education to give accreditation to institutions offering distance learning courses, estimates that there are 3 million distance learners nationwide (cited in Instructional Systems, Inc., n.d.).

In December of 2000, the Web-based Education Commission's Report to the U.S. Department of Education reported that postsecondary enrollment in distance education courses was projected to triple to almost 15percent of total enrollment in 2002 from just 5percent in 1998 (Partlow and Lavagnino, 2001, p. 6).

"College and universities are the most wired community on the Web with over 90 percent of college students accessing the Internet, 52 percent daily. College students represent the single largest non-gender based online demographic, constituting 24 percent of the total number of adult Internet users. … In 2002, 2.2 million students are expected to enroll in distributed learning courses… (Moe and Blodget, 2000, p. 169).

Gartner Research completed a survey of 45 major institutions of higher education in 1999-2000, in order to determine how academic institutions were utilizing DL technologies. Fully two-thirds of its survey group reported deploying DL systems. Only a single respondent had neither deployed a DL system nor planned to consider one (Yanosky, 2000).

In March 1999, the State Higher Education Executive Officers (SHEEO) published a survey of state polices and distance education technology. Thirty-three states reported operating virtual universities or elected to participate in a regional or national virtual university (e.g., Western Governors University or Southern Regional Electronic Campus) to deliver degree programs through distance education technology (Epper, 1999, as reported in Institute for Higher Education Policy, 1999, p. 2).

In 2000, Dun and Bradstreet estimated that institutions offering distance learning programs had doubled in the previous year (University Continuing Education Association, 2000, as cited in Eaton, 2001, p. 3). In 2001, The Future's Project at Brown University reported in its database of postsecondary institutions offering virtual coursework that 1,180 institutions were offering "everything from courses to full degree programs online" ("Institutions Offering…," 2001). See Figure 9 for a summary of findings.

Figure 9: Data on Institutions Offering Virtual Courses as of February 21, 2001

Type of institution	Percentage	Number
Public 2 year	32.5 percent	384
Public 4 year	23.6 percent	278
Private 4 year	17.5 percent	206
Purely virtual	7.8 percent	92
Law Schools	6.4 percent	96
Consortia	5.2 percent	61
High Schools	0.6 percent	7
Other	6.6 percent	76

From "Institutions Offering…" (2001)

Visser (2001) points out that "not only is the provision of educational opportunities an economically viable activity, increasingly the intervening technological infrastructure is also a considerable economic factor, which is being pushed by early exposure to the technology (p. 4). Ninety percent of public elementary and secondary schools are connected to the Internet and 49 percent of schools are equipped with high-speed connections such as T-1 lines, according to the report, Technology in Education, 1999, cited in the CHEA Update Number 3 on Distance Learning in Higher Education, cited in Visser (2001, p. 4).

The growth of distance learning is not confined to the U.S. Visser (2001) points out that "the EU distance education market could be worth one billion ECU." The same document estimates that 2.5 million people are studying at a distance for vocational purposes in the

European Union. The total enrollment in six European open universities: Spain (two), Germany, Netherlands, Portugal and the United Kingdom is quoted at 450,000 with at least another 150,000 distance learners enrolled at traditional universities (the majority in Finland, France, Sweden and the United Kingdom). An additional 1.2 million distance learning students are estimated to be more or less evenly split between government and commercial providers in the non-university sector (Visser, 2001, p. 3).

There is, in addition, an emerging trend toward true globalization of higher education. There are a number of institutions that manage truly global operations--the British Open University, Jones, The University of Phoenix, Jones International University, KaplanCollege.com, The Open University of Hong Kong, The African Virtual University and the University of Highlands and Islands, to name a few (Haddad, 2001). Other e-learning applications to note include online high schools (i.e. the Florida Virtual High School) as well as online homework help (i.e. Homeworkhelp.com, Toptutors.com and Tutor.com).

With colleges and universities racing to meet the needs of a variety of audiences through the provision of distance learning opportunities, companies such as Blackboard, WebCT and Real Education have moved vigorously to get more visibility for their products (Blumenstyk, 1999, p. 1). Higher education institutions have seen a need to be active in the DL world but many have lacked the expertise to manage such an undertaking. "They are looking at companies like Real Education to jump-start it" (Blumenstyk, 1999, p. 1). The Connecticut State University System, for example, signed a three-year contract with Real Education in October of 1999. The company helped the university launch 13 DL courses in just 35 days (Blumenstyk, 1999).

The diversity of new organizational models supporting DL development and delivery is noteworthy. These models now include new stand-alone degree programs offered by online institutions, degree programs granted by online consortia (groups of degree-granting institutions that offer courses online, with degrees granted by the consortium itself); non-degree opportunities offered by online consortia (where degree authority is retained at the institutional level); educational opportunities offered by corporate universities; and online programs and courses offered by organizations that are not affiliated with institutions and that may or may not include degrees or other credentials. Altogether there are estimated to be several thousand American institutions of various kinds enrolling well over a million students (Strehle, 2000). See Figure 10 for a summary of organizational entities now active in the distance learning environment.

This sometimes confusing array of DL providers is being greatly influenced by what is characterized as the "aggressive and growing presence" of the for-profit higher education sector (Eaton, 2001, p. 4). The University of Phoenix, for example, currently enrolls 75,000 students, a 22 percent increase over last year. Their online campus grew by 44.7 percent to 13,799 students. The projected growth of their site-based programs is 17-18 percent and 35 to 40 percent online (Twigg, n.d.). In addition to Phoenix, there are now over 650 for-profit degree grant universities and colleges in existence (Newman and Couturier, 2001 p. 4).

Figure 10: New Organizational Entities Engaged in Distance Learning

Organizational type	Description	Comments
Virtual University Consortia	All operate a web site that lists participating institutions and courses, and in some cases, degree programs online. Primary operational activity is as a referral service to courses on participating campuses.	Because each participating institution has its own residency requirements and transfer policies, students generally have limited opportunities for study beyond what a particular institution traditionally offers. Most students taking courses included in these virtual university endeavors are on-campus students studying online at their home campuses.
Independent, Non-profit Institutions	Each targets working adults as its primary audience. Primary focus of curriculum is in high demand areas such as business management, health care, education and information technology.	Because they grant degrees and enable students to study at their own pace and time, they are closely aligned to the needs of the workforce.
Partnerships and Subsidiaries	Traditional institutions partner with private companies or create for-profit or non-profit subsidiaries. Many of these efforts result from the need for institutions to develop new structures which are responsive to the quickly changing demands of individuals and corporate universities for credit and non-credit courses.	Enables institutions to gain flexibility in order to respond to constantly changing needs. Major challenge is in the raising of capital for such ventures.
Corporate Universities	2000 corporate universities existed in the U.S. in 2001. They primarily focus on non-credit and non-degree offerings.	Most represent "re-branding" of corporate training function; show few signs of higher education activity.
For-profit Institutions	Primarily site-based, but growing online components.	Close attention paid to learner needs, 24x7 learner support, and efficient use of staffing resources, short intensive study periods, and a curriculum taught by practicing professionals.

Adapted from Twigg, 2002, 1-2

For-profit DL programs are highly competitive because they pay close attention to service levels for learners, efficiently use staff to serve students, mandate teacher training, enforce rigorous evaluation of the teaching process, emphasize supporting all teachers, including part timers, and focus on professional expertise (Twigg, n.d.). The tools and methods that play a crucial role in the educational programs provided by commercial DL providers include:

- Collaborative environment tools allowing students to connect with instructors anywhere.
- Multimedia learning materials prepared by a few experts and used by many more.
- Use of network technologies allowing student to learn anywhere, anytime.
- Learning management systems which facilitate the monitoring of the user's progress, the diagnosis of the learner's needs and problems and the adjustment of structure and flow of content and of instructional system to effectively address learning objectives and needs. (Haddad, 2001)

"These providers are creating a new kind of institution---one built on inclusiveness and accessibility" (Twigg, n.d.).

The world of for-profit education is further complicated by the fact that many of the best known non-profit universities, both public and private, have established for-profit subsidiaries or joined with for-profit firms in joint educational enterprises--NYU, Columbia, Duke, Standford, Chicago, Nebraska and Maryland are examples. (See Figure 11 below.) Temple University had a for-profit subsidiary, called the Virtual Temple, which it closed in the summer of 2001. Temple's president called the decision a simple one. "I didn't see any profit potential here" (Blumenstyk, 2001, p. A29).

Figure 11: Non-profit Universities with For-profit Distance Learning Spin-offs

University	For-Profit Arm	URL
Babson College	Babson Interactive, Inc.	http://www.babsoninteractive.com/
Columbia University	Fathom	http://www/fathom.com
Cornell University	eCornell	http://www.ecornell.com/
Duke University Fuqua School of Business	Duke Corporate Education, Inc.	http://www.duckce.com/
New York University	NYU online	http://www.nyuonline.com/
UCLA	Global Film School, Inc.	http://www.globalfilmschool.com/
University of Maryland	UMUC Online.com, Inc.	http://www.umuc.edu/gen/virtuniv.html
University of Nebraska	Class.com	http://www.class.com

The potential to make money is still seen to be a viable goal for those in the investment community. Investors are seen to have an increased willingness to provide capital for distance learning ventures (Eaton, 2001, p. 4). In the year 2000, four U.S. investment firms conducted detailed market analyses of what they refer to as the e-learning sector, encouraging their clients to invest in e-learning companies. They projected remarkable

growth in online learning worldwide and filled their reports with attention grabbing numbers and claims. Capper (2001) captured their enthusiasm in quotes from four separate forecasting studies:

> John Chambers, CEO of Cisco Systems argues that, "Education over the Internet is going to be so big it is going to make e-mail look like a round error." … The online training market is expected to nearly double in size every year; reaching approximately $11.5 billion by 2003…Venture capitalists see the growth potential of e-learning. Over US$1 billion in private capital has been distributed to e-learning companies and more than US$302 million in public equity was raised in 1999 alone…Knowledge services-education and corporate learning for the new economics is a $2 trillion industry globally. …By 2002, technology based training will capture the majority of dollars for IT training, at 55percent versus the 45percent share by instructor-led methods. (Capper, 2001, p. 7)

Fortune Magazine, in a special section on online learning published in 2000, expressed enthusiasm about leveraging the "unique attributes of the Internet" to provide online learning opportunities for professionals ("Online Learning," 2000.) Fortune proclaimed that online learning is "a market whose time has come" (p. S18).

These quotes suggest that "e-learning" is gaining acceptance in the marketplace, for investment purposes. In addition, more and more enterprises are realizing that they can use technology to deliver training. Lundy (2001) predicts that the e-learning market is poised for explosive growth through 2005, when it will be a $33.6 billion market "…E-learning will become a standard way of deploying knowledge transfer programs" (Lundy, 2001, p. 1).

Both non-profit and for-profit DL efforts are being viewed as business enterprises. "Virtual universities are looked at as cash cows…Everyone thinks they are going to make a lot of money and they're afraid of being left behind" (Sostek, 2001, p. 3). The belief is that internet-based delivery, coupled with a business model for managing resources, can reach large groups of new students, creating "an entirely new and massively expanded market for higher education" (Dickinson, 2001). The centerpiece of this position is the belief that the growing number of working adults will need constantly to update and extend their skills. According to the Bureau of Labor Statistics, in 2000, only 40percent of working adults in the U.S. (age 25 to 65) have a post-secondary degree (two-year or more) despite the fact that 85percent of current jobs require education beyond high school ("Lifetime Learning…," 2000, p. 2).

These statistics are confirmed by the Web-based Education Commission's December 2000 report to the U.S. Department of Education (Web Based Education Commission, 2000), and summarized by Partlow and Lavagnino (2001, p. 6). They report current data regarding the growth of distance education in postsecondary education as well as changing student demographics which favor continued expansion of DL opportunities.

Student demographics

- Post secondary enrollment in distance education courses was projected to triple to almost 15 percent of total enrollment in 2002 from just 5percent in 1998.

- A record 15.1 million postsecondary students were projected to enroll in DL courses in the fall of 2000. Between 1998 and 2010, full time enrollment is projected to increase by 22 percent, with part time enrollment increasing by 16 percent.
- Despite the rising enrollments described above, just 16percent of college students fit the traditional 18-22 old profile, attend full time and live on campus.
- The adult age cohort is the fastest growing segment of students in postsecondary education.

  Educational needs of prospective students
- It is estimated that 50 percent of all employees' skills become outdated within 3 to 5 years.
- An estimated 77 million adults are employed men and women who must stay abreast of their fields or are preparing to enter new and emerging fields, but are unwilling or unable to become full time resident students on campus.

Thus, many distance learning proponents see aggressive adoption of distance learning by higher education institutions as a matter of survival. "With competency-based certifications becoming increasingly important, critics argue, there is the risk that both these students and the much larger population of potential adult learners will seek to gain relevant qualifications elsewhere, if higher education cannot offer them the flexibility and the programs they need" (Dickinson, 2001).

A Gartner research study published in October of 2001 suggests that "many of the assumptions underlying this vision of the future for higher education appear to be fundamentally flawed. "In particular, current estimates of the potential growth of both domestic and international demand for higher education services are drastically unrealistic" (Dickinson, 2001, p. 2). The Gartner study shows that "purely remote distributed learning courses…make up a very small proportion of total high-education enrollments - some 6 percent of the total…What is more, between two-thirds to three-quarters of students enrolled in such courses are also enrolled in classroom-based courses on campus" (Dickinson, 2001).

What is more to the point, the proportion of part-time older students, who are seen to be the major group interested in distance education, is not growing, according to the Gartner study. In fact, the percentage of such students accessing higher education opportunities is falling and predicted to continue falling over the next ten years (Dickinson, 2001). See Figure 12.

Figure 12: Higher Education Enrollments by Enrollment Status and Sex

	1985	1990	1995	2000	2005	2010
Full time men	29%	27%	26%	25%	25%	25%
Full time women	28%	30%	30%	31%	32%	33%
Part time men	18%	18%	18%	17%	17%	17%

Part time women	25%	25%	26%	27%	26%	25%

Adapted from Dickinson, 2001.

> In fact, there is no long-term trend toward part-time enrollment in higher education. That trend was the product of a particular moment in the social and educational history of women in our country--a moment which has now passed. In fact, it is also not true--as some proponents of e-learning have argued-- that a growing proportion of students live off campus. In fact, the number of students seeking the traditional residential campus experience is rising, and institutions are expanding residential space. (Dickinson, 2001)

In addition, though a 1998 report suggested that executives were smitten with e-learning for employee training, technology-based training for workers in the workplace is currently hovering in the 8-9 percent range (Rossett, 2002, p. 4). "At the same time, participation in instructor-led training experiences has increased slightly" in the past three years (Rossett, 2002, p. 4). Rossett suggests that e-learning should not be judged as a disappointment or failure, based on the limited adoption of e-learning strategies so far. Rather, she characterizes what is happening as a "breather," suggesting that :

> resources are now being devoted to enhancing technology platforms…[In addition,], prior glitches have forced attention to essential heavy lifting associated with e-learning, such as the development of strategy, outcome measures, and alliances across the organization and with out sources [sic]. Even though student numbers have not raised dramatically, strategy and technology infrastructure are being established (Rossett, 2002, p. 4).

Section 3: Strategic Planning, Standards Development and Cost Effectiveness in the DL Environment

While the more than three thousand traditional institutions in the United States vary greatly in mission, size, curriculum, selectivity, faculty expertise and background, level of offerings, and type of location, they share a number of characteristics that serve to define them. Because these characteristics are widely recognized and understood, they offer a point of departure for the discussion of distance learning and strategic planning which follows. The basic characteristics that help to define traditional universities and colleges include the following:

- A residential student body;
- A recognized geographic service area from which the majority of students are drawn; this service area can be a local community, a region, a state, and in case of elite institutions, the entire country;
- Full time faculty members who organize curricula and degree, teach in face-to-face settings, engage in scholarship, often conduct public service, and share in institutional governance;
- A central library and physical plant;
- Non-profit financial status;
- Evaluation strategies of organizational effectiveness based upon measurement of inputs to instruction, such as funding, library holdings, facilities, faculty/student ratios, faculty qualifications, and student qualifications (Hanna, 1998).

Distance learning has the ability to move far beyond these characteristics in serving new learners, by eliminating geographic barriers, providing instruction at the convenience of the student, and transforming ideas about student-faculty relationships, faculty load, and institutional autonomy (Washington State Higher Education Coordinating Board, April, 1999, p. 8). Figure 13 illustrates ways in which the "distance learning university" modifies assumptions and characteristics of its parent organization.

One of the questions that are central to the success of the transformational processes suggested in this chart is whether or not colleges and universities are capable of changing long-standing educational practices on their own. "The conventional wisdom appears to be that as the Internet becomes another means by which college students can learn and develop, higher education institutions, too strongly committed to existing teaching practices, are in for a long and difficult period of adjustment" (Gifford, et al., 1999, 13-14).

Academic distance learning programs suffer from a dearth of standards and recognized leaders in the field, and an abundance of unproved technologies and performance models (Sood, 1999). Complexities surrounding the adoption of DL technologies are compounded by the continued inability to resolve issues within the larger learning environment. These issues include "both the literal ownership of content and the organizational ownership of policies and responsibilities (Sood, 1999). Many contend that higher education institutions cannot

respond quickly enough either to the needs of learners or to the solving of policy issues that are evolving out of new educational delivery models. Thus, they "cannot be counted upon to deliver to their constituents the benefits the Internet provides" (Gifford, et al, 1999, p. 14).

Figure 13: Comparison of Traditional Residential Universities and Extended Universities

Input	Traditional universities	Extended distance learning universities
Philosophy	Students come to campus.	Campus goes to students.
Mission	Mission defined by level of instruction.	Externally focused, degree completion and workforce development.
Funding	$ subsidy per full-time student.	More self-sustaining and market driven.
Curricula	Relatively fixed & comprehensive curriculum.	More flexible curriculum content for workforce development
Instruction	Most courses are lecture based.	Greater variety of methods and use of student experience.
Faculty	Primarily full-time faculty; academic preparation and credentials.	Greater use of adjuncts with professional experience.
Library	Volumes in library.	Access to specific documents and resources appropriate to program.
Students	Selectivity at admission.	Life and work experience can be factor in admission.
Learning Technology	Enhance lecture-oriented instruction.	Both lecture oriented and used to extend access.
Physical facilities	Extensive physical plant.	Still campus based but less reliance on physical plant.
Productivity Outcomes	Student credit hours and degrees.	Student credit hours and degrees.
Governance	Board of Trustees.	Board of Trustees.
Accreditation	Institutional by region; individual programs or disciplines are also accredited.	Institutional by region; disciplines and programs also part of parent organization's accreditation.

Adapted from Hanna, 1998.

Pascarella and Terenzini (1991), in their seminal book, *How College Affects Students*, indicate that Americans expect their colleges and university to accomplish a number of significant goals:

1. Transmitting the intellectual heritage of western civilization
2. Fostering a high level of verbal and mathematical skills
3. Developing an understanding of political, social and cultural institutions
4. Facilitating reflective, analytical, critical and evaluative thinking
5. Developing value structures and moral sensibilities
6. Facilitating personal growth and self-identify

7. Fostering a sense of career identify and vocational competence (Dadabhoy, 2001).

Gifford, et al. (1999) argues that educational traditionalists are all but incapable of employing Internet technologies to reach such transformational goals. The reason: "Individuals who have benefited personally from their familiarity with well-established institutional practices tend to limit their focus and energies" to highly deliberative actions that emphasize hierarchy and tradition" (p. 14). "They believe they are immune to the winds of change and are staking their futures on the traditions of the past and business as usual" (Olcott, 2000.)

The argument that the pace of change required in the distance learning environment is likely to be overwhelming to higher education traditionalists is also the theme of an anthology on the future of technology in higher education Dancing with the Devil: Information Technology and the New Competition in Higher Education (Katz and Associates, 1999). The first article by Duderstadt (1999) suggests that while "business as usual" may suffice for the next three to five years, there is an imperative to create, analyze, preserve and distribute information in efficient, easily accessible venues that provides users with the immediate capacity to apply information and knowledge. Olcott (2000) expands on this point of view by stating that it is "impossible for college and universities to be the sole gatekeepers of information…higher education has lost its once exclusive knowledge base."

Janicki and Liegle (2001) suggest that education has the potential to be the key application in electronic commerce. However, in referring to commentaries made by Hamalainen, et al. (1996) and Robin and McNeil (1997), they state that only marginal improvements in student performance are possible if educators "continue to re-implement traditional and conventional models borrowed from the classroom."

Duderstadt, in the chapter referred to above, predicts that in the future faculty will no longer be able to dictate "what it wishes to teach, how it will teach it and where and when the learning will occur…The real question is not whether higher education will be transformed but rather *how* and by *whom*" (Duderstadt, 1999, p. 1, 9-10, emphasis in the original, as quoted in Gifford, et al, 1999, p. 15).

Transforming higher education systems through the mainstreaming of distance learning into the academic infrastructure will affect all educational management systems and models. Distance learning, with its demand for different infrastructure and support systems, demands new ways of operating, new support structures for faculty and staff and new funding formulas. Distance learning, "with its capacity for flexibility and just-in-time learning, challenges assumptions about the academic calendar, space planning, and scheduling that are as old as the Academy itself. Even the traditional week-long calendar can take on a new look with "24 by 7" operations…"(Washington State Higher Education Coordinating Board, April, 1999, p. 8-9).

Despite examples of course and program delivery experimentation reported in the literature (i.e., Penn State World Campus, University of Wisconsin Center for Learning Innovation), "most universities have not challenged traditional assumptions and approaches with respect

to learning, students and processes" (Hanna, 1998). Distance learning efforts are found marginalized in continuing education programs and divisions. Consequently:

> their influence on core programs, operating assumptions and values remain low. Their capacity for adapting to changing markets is often resented rather than appreciated by campus-based faculty, staff, and students, who see such efforts as diverting precious resources, offering lower quality education, threatening time-honored conceptions of teaching and learning, and diminishing the status of institutions. (Hanna, 1998).

The Case for Integrating Distance Learning into the Core of Higher Education

In order gain commitment and support for distance learning efforts so that these efforts are mainstreamed within the traditional university, it is essential "that the contextual interrelation of processes be examined, understood and documented" (Vaugh, 2001). For example, distance learning can be viewed as a transformation model, bringing new values into core functions (Dubois, 1999) and raising questions such as:

> …what is the institution's commitment to educational access?
> Would distributed education enhance the fulfillment of that goal? Will
> it seem inconsistent with policies on selectivity and/or the importance
> of the residential experience? Does distributed education complement the institution's
> mission, culture, and historic strengths or does it create discord?
> (Oblinger, et al., 2001, p.7)

Answering such transformational questions involves three steps : 1) development of a systematic process to arrive at consensus; 2) defining steps and factors to reach consensus; and 3) identifying critical planning steps. Acceptance of these three processes as significant factors in the adoption of DL strategies will result in a definitive strategic plan which will ensure success in delivering distance learning programs once they are implemented (Lane, n.d.).

The three steps listed above suggest that the basis of decision making about DL adoption encompasses a lot more than acceptance of a strategic plan focusing on technical design. Decision making and strategic planning also rely on a process for accepting things "which are new and different." Lane itemizes the states of acceptance in the diffusion of innovation (as represented by the adoption of a DL program in a higher education institution): These steps include: 1) creating awareness; 2) recognizing real need; 3) understanding the advantages and value of DL to the organization; 4) evaluation of DL role in helping the organization meet its mission; 5) planning a trial DL program; 6) reviewing what the organization does now to determine how DL fits in; 7) reviewing what the organization does now to determine if DL is compatible; 8) adopting a contingency plan for the support of DL efforts; 9) adopting a plan for ongoing commitment to DL efforts (Lane, n.d.).

These steps, by focusing on the mission, culture and strengths of the institution itself (rather than on the technology or the distance learning program), suggest that the major themes for a

DL strategic plan should emphasize its role in helping the higher education institution meet its goals. The following higher education goals are suggested in this regard:

- Expanding access
- Alleviating capacity constraints
- Integrating electronic learning into the traditional learning environment
- Learning and Student Services Online
- Quality assurance
- Costs of technology and return on investment
- Institutional transformation (Farrell, 2002; Hurst, 2001; Oblinger, Barone and Hawkins, 2001; Rogers, 2001; Washington State Higher Education Coordinating Board, May, 1999).

The following sections of this paper will address the above points in turn.

Expanding Access

Five reports, one by the College Board, the second by the Institute for Higher Education Policy, the third by the Web-Based Education Commission, the fourth by the Consumer Federation of American and Consumers Union and the fifth by the U.S. Department of Commerce, suggest that policy makers must proceed with care to ensure that access to DL opportunities is available for all who want it.

1) The College Board's report, The Virtual University and Educational Opportunity-Issues of Equity and Access for the Next Generation (Gladieux and Swail, 1999), targets access as its theme. Focusing primarily on internet-based distance learning courses, the report argues that information "have-nots" are at a "distinct disadvantage" when it comes to taking courses online. The major barrier is the lack of computer or online service both in the home and in school. The report recommends that institutions make access a fundamental goal when designing online courses.

2) The Institute for Higher Education Policy report, Quality on the Line, Benchmarks for Success in Internet-based Distance Education (2000), reviews the principles, guidelines and benchmarks that tend to "ensure quality distance education" (p.1). The Institute identified 45 benchmarks, covering such areas as course development, faculty training, student services, learning resources, infrastructure, and outcomes assessment. It is under infrastructure that the issue of access is addressed: "It is important to note that a possible disparity exists between the technology that an institution might possess and the technology available to the typical students. Although institutions may have enhanced, or are enhancing their capability with high speed networks, with additional bandwidth, and improved video quality, course development must take into consideration the technology that the students possess" (p. 15).

3) The Web-Based Education Commission's report, The Power of the Internet for Learning, was submitted to Congress and the President in December of 2000. It points out that "college students nationally are more than twice as likely to have access to a college-owned computer than their private historically-black colleges and universities counterparts (one computer for every 2.6 students in higher education institutions nationally vs. one for every 6

students at UNCF [United Negro College Fund] colleges and universities) … Because so many of these institutions are located in rural areas, they face the additional burden of limited access to high-speed Internet access or other learning resources." (Web Based Education Commission, p. 28).

Among the most significant divides in technology equity may be the ability of educators to take full advantage of learning technologies in support of distributed learning. (Building the Net, 2001). Davis, et al. (2001) point out that "bridging the access doesn't always begin with hard wiring. Building the human connections can also make a difference" (p. 11). In late 1999, with a four-year $6 million National Science Foundation grant, the Advanced Networking with Minority Services Institutions (AN-MSI) project was started, to link Hispanic serving institutions, historically Black Colleges and Universities and Tribal Colleges and Universities with high-tech partners in computing and higher education. The four major goals of this grant program have been to assist MSI leadership with IT planning, network technologies, Internet connectivity and academic applications. Through this effort, meaningful incorporation of technology and the Internet at more than 300 MSI institutions has begun to address the IT gap. Noteworthy in the DL area are Internet 2 projects involving research on cross cultural "collaboratories" between MSI's such as the University of Texas at El Paso, Howard University and the University of Michigan (Davis, et al., 2001).

4) A report sponsored by the Consumer Federation of American and the Consumer Union, Disconnected, Disadvantaged and Disenfranchised (Cooper, 2000), suggests that the "digital divide" is still growing. The gap puts "millions of Americans at a disadvantage in our increasingly 'online' society" (Consumers Union, 2000). Findings show that as of 2000, 47 percent of 1,900 respondents did not have access to the Internet at home. The "disconnected are much more likely to be lower income, older and minority households (Cooper, 2000). Consequences of disconnectedness "is not only relative, it may be absolute. They may be cut off from important personal, cultural and civic activities" (Cooper, 2000, p. 15). The report pinpoints the steps to be taken to overcome the digital divide. "In essence, getting people PC hardware and training is the key" (Cooper, 2000, p. 19).

5) The most recent report, sponsored by the U.S. Department of Commerce in 2002, A Nation Online: How Americans are Expanding Their Use of the Internet, shows that disparity of access is beginning to decline.

> More than half of the nation is now online. In September 2001, 143 million Americans (about 54 percent of the population) were using the Internet--an increase of 26 million in 13 months….Between December 1998 and September 2001, Internet use by individuals in the lowest income households (those earning less than $15,000 per year) increased at a 25 percent annual growth rate. Internet use among individuals in the highest-income households (those earning $75,000 per year or more) increased from a higher base but at a much slower 11 percent annual growth rate (U.S. Department of Commerce, 2002, p. 1).

A number of groups are still unlikely to be Internet users:

- People in households with low family incomes -- 75.0 percent of people who live in households where income is less than $15,000 and 66.6 percent of those in households with incomes between $15,000 and $35,000.
- Adults with low levels of overall education--60.2 percents of adults (age 25+) with only a high school degree and 87.2 percent of adults with less than a high school education.
- Hispanics--68.4 percents of all Hispanics and 85.9 percent of Hispanic households where Spanish is the only language spoken.
- Blacks--60.2 percent of Blacks. (U.S. Department of Commerce, 2002, p. 73)

These findings are consistent with findings in a series of earlier studies completed by the National Telecommunications and Information Administration (NTIA), which reported in 1998 that there was a serious gap in access to the Internet between White and Hispanic or Black households (U.S. Department of Commerce, National Telecommunications and Information Administration, 1999).

If we expand this analysis to a world view, it is worth noting that only 5 percent of the world's population is online (Dennis, 2000, cited in Naidoo, 2001, p. 12). The prediction is made that this number is likely to increase to 640.2 million by 2004, which will represent approximately 14 percent of the world's population (Naidoo, 2001, p. 12-13).

In spite of the fact that the gap between those who have access to the Internet and those who do not seems to be shrinking slowly, some researchers talk of the "next digital divide," related to "the effective use of information, the ability for an information user to be more than a passive consumer, and the availability of relevant, useful, appropriate and affordable content." As the access gap narrows, we run the risk of politicians and the media claiming victory over the "Digital Divide," while significant barriers to equity still remain (Besser, 2001). UCLA and Pacific Bell are sponsoring an initiative for "21st century literacy's" that is tackling some of these issues (http://www.newliteracies.gseis.ucla.edu/).

Issues of Capacity

The capacity of information and communication technology has been growing exponentially over the last 10 to 15 years. Computers are now more powerful, satellite and wireless technology has increased transmission capacity, the cost of bandwidth is falling, the reach of digital satellite transponders and fiber optic cable for broad bandwidth are increasing, "last mile" solutions (such as digital subscriber lines and coaxial cable), are becoming more prevalent, and software development such as multimedia authoring systems are making it easier to create digital materials such as computer simulations and education materials (Bates, 2001, p. 29, Moore and Cozine, 2000, p. i.).

Despite the increased capacity of information and communication technologies, the impact in higher education has been "slow and marginal…This is due not only to lack of vision or commitment by educators and policy makers; there are significant structural and cultural barriers or restrictions that have slowed the potential for change in education compared with

other sectors" (Bates, 2001, p. 30). These issues are discussed below, first by looking at the major technologies that populate the higher education universe and then how these technologies impact the distance learning environment.

Major technology applications currently in use in the DL environment

No one technology can support all types of teaching and learning at a distance -- the most effective approach is to combine a range of technologies (Lee and Thompson, n.d, p. 14). Lane suggests that using multiple types of media (video, audio, and data) ensures that "all learning styles are met and that significant methods for interaction are provided" (Lane, n.d.). Each of these media serves a specific purpose:

- A strong print component can provide much of the basic instructional content in the form of a course text, as well as readings, the syllabus, and day-to-day schedule.

- Interactive audio or video conferencing can provide real time face-to-face (or voice-to-voice) interaction. This is also an excellent and cost-effective way to incorporate guest speakers and content experts.

- Computer conferencing or electronic mail can be used to send messages, assignment feedback, and other targeted communication to one or more class members. It can also be used to increase interaction among students.

- Pre-recorded video (on tape or CD/DVD) can be used to present class lectures and visually-oriented content.

- Fax can be used to distribute assignments, last minute announcements, to receive student assignments and to provide timely feedback. (University of Idaho, Guide #1, 1995).

The widespread use of wireless personal digital assistants (PDA) and embedded screens in cellular phones is now providing both enhanced communication and interaction. The increase in the power of personal computers is leading the way toward virtual reality learning environments. Technologies such as head mounted displays and data gloves are providing interfaces for immersive, partially immersive and enhanced reality environments (Sonwalkar, November, 2001, p. 11).

The strengths and limitations of various distance learning technologies are summarized in Figure 14.

Figure 14: Distance Learning Technologies: Strengths and Limitations

	Strengths	Limitations
Traditional Face-to-face meetings, workshops, and classes	Can use all senses May be easier to receive immediate feedback People most accustomed to face-to-face meetings May be "rewards" associated with travel	Can involve considerable costs if people need to travel to learning site Participation may be limited due to time or distance conflicts
Work station - time shifting VCR, computer, CD-ROM, DVD	Good for delivery of material at variable times	Production costs can be high Location specific
Real-time distance learning (Two-way video and two-way audio)	Two-way video and two-way audio - can see and hear Opportunity for immediate feedback Students may not need to travel (or travel as far) to participate in learning Medium-range variable costs, but international connection costs may be considerable	Compressed video will allow the ability to see limited number of sites at the same time Sometime difficult to hear (subject to audio problems) Some video distortion due to compression of signal Requires considerable coordination re: room and technical support High fixed costs (approximately $80 to 100K per classroom) Reliability of equipment, technology and connections may be questionable No opportunity for time shifting unless combined with another technology (e.g., videotape)
Satellite (one-way video and two-way audio)	Good for reaching large area that is geographically dispersed and/or large number of downlink sites High variable costs (satellite time). Participants may not need to travel (or travel as far) to participate in learning activities	Two-way audio, but only one way video. Originating site can't see remote sites. High fixed costs for uplink site (approx. $300K) Requires considerable coordination re: scheduling of rooms, technical support No opportunity for time shifting unless combined with another technology (e.g. videotape)
Synchronous, computer	Relatively low fixed costs and low telecommunications costs Good for delivering information in which timing of communication is critical Opportunity for immediate feedback	Can be chaotic and confusing. Primarily text based and graphic communication Users must have access to computer and modem No opportunity for time shifting
Audio conferencing	Wide access to telephones in the	Audio only

	U.S Easy to use: participants may already be familiar with technology Relatively low variable costs and low fixed costs Relatively low variable costs and low fixed costs Can be time shifting paired with visuals delivered via fax, mail, computer, etc. Opportunity for immediate feedback Highly interactive	No opportunity for time shifting
Asynchronous distance learning Video-based courses	Videocassette players widely available Offers sight, sound and motion Opportunity for re-play Pass-along value East to use; people already familiar with technology Opportunity for timeshifting Almost unlimited in terms of what can be sent	One-way communication. May encounter high "drop out" rate Production costs may be high International formats may be incompatible
Computers and modems	Production costs are variable, depending on the message transmission (text only? audio? video?) Options include email, mailing lists, and web pages Opportunity for timeshifting Highly interactive Can also be combined with other visual and audio communications strategies (audio cassettes, video cassettes, CD-ROMs) Permits just-in-time access to information User-controlled/opportunity for timeshifting	Primarily text-based and graphics Message can appear "flat"
Multimedia on demand (just in time)	Accessible from user's location No limit to what can be sent, but mostly print-based Can be combined with audio or video cassettes or CD Opportunity for timeshifting	Production costs can be very high Requires high bandwidth
Correspondence courses		Not very popular anymore Requires self-motivated learning who are good time managers Interactivity is slow and difficult

Adapted from "Distance Learning Technologies: Strengths and Limitations," (need additional citation info.)

Sonwalker (2001) suggest that pedagogical models developed for *online* distance education :

> do not take full advantage of the online medium. In attempting to harness the capabilities of digital interfaces, the mistake is often made of recreating a class-room-teaching model within an online learning environment. Online technology designed to mimic the classroom becomes a restriction and a barrier to the teacher's ability to impart knowledge. A fundamental paradigm shift is necessary to create a pedagogical model with the asynchronous technological interface in mind. The pedagogy must allow for flexibility, interactivity, and media-rich and adaptive environments that both provide individualized learning and are also accessible to large numbers of learners for collaborations and group discussions.

Sonwalkar (2001) presents a learning model that can be used for distance learning. This model includes five learning approaches: apprenticeship, incidental, inductive, deductive and discovery. "Each model offers a unique way to represent content" via a technological application…The design and development of combined media components--text, graphics, audio, video, animation and simulations--for enhancing the learning process will depend on the learning model appropriate for the delivery of given course content."

Another way to categorize technologies used in the distance learning environment is to use the "4-square map of groupware options" that was developed by Johansen et al. (1991) and cited by McIsaac and Gunawardena (2001, p 409-410). "This model seemed most suitable to our purpose because we see distance education moving from highly individualized forms of instruction, as in correspondence education, to formats that encourage teaching students as a group and collaborative learning among peers" (McIsaac and Gunawardena, 2001, p. 409). The 4-square model classifies four types of technologies that support group learning processes: 1) same time/same place, 2) different time/different place; 3) same time/ different place; and 4) same place/different time. A current textbook in the field of distance education further expands on these four criteria, by focusing on synchronous learning (same time/ different location) as contrasted with asynchronous learning (anywhere/anywhere access) (Simonson, et al., 2000). Figure 15 demonstrates how the time and place continua intersect.

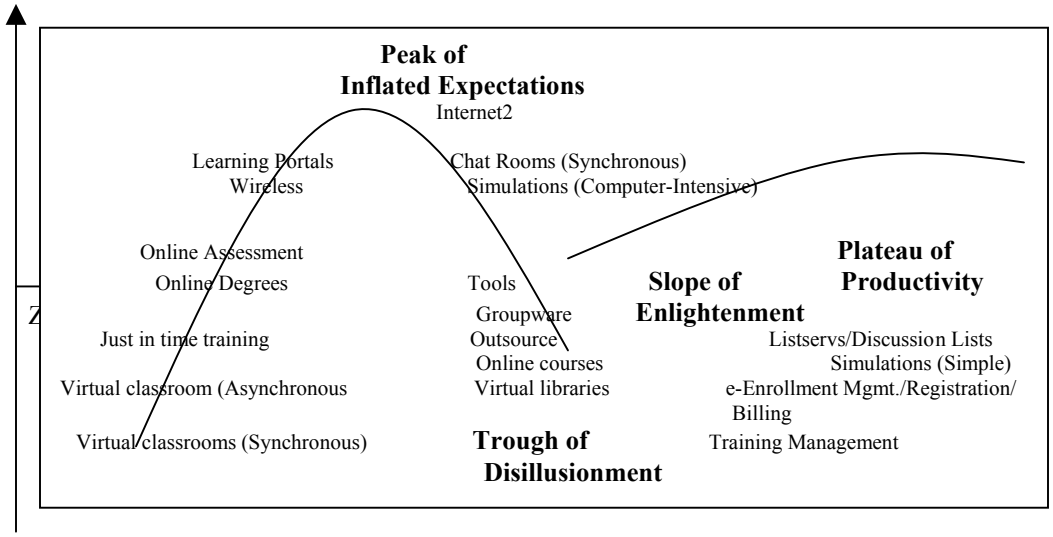
Figure 15: Scenarios for Classroom and Distance Learning Delivery

	Same time	**Different time**
Same place	Classroom teaching, face-to face	Learning resource centers, labs, study centers, where learners learn at their own pace
Different place	Audio conferences and video conferences, television with one-way video, two-way audio, computer conferencing with listener-response capability	Home study, computer conferencing, interactive video, tutorial support by e-mail and fax communication

Adapted from Commonwealth of Learning, 2000 p. 6; McIsaac and Gunawardena, 2001 p. 410.

A third way to look at distributed learning technologies is through what is called by Gartner research a "distributed learning hype cycle" (Zastrocky, 2000). "The Gartner Hype Cycle for distributed learning (DL) … provides a snapshot of the set of technologies in the cycle of hype and the disillusionment that accompanies a technology's path to maturity" (Zastrocky, 2000, p. 1). See Figure 16.

Figure 16: Distributed Learning Hype Cycle for Higher Education Visibility



All of the technology models discussed thus far includes only those technologies used for course *delivery*. However, the technical framework for distance learning includes a lot more. Wilde et al. (n.d.) created a matrix (seen in Figure 17) for describing the technical environment within which DL functions. It includes technology for course/program preparation, student support services, delivery, course/program evaluation, and feedback. It is a valuable addition to model building in the DL environment, because even as specific technologies change, it is still a useful way of envisioning the totality of technologies needed to support the DL effort.

Figure 17: A Framework for Technology Support for Distance Learning

Distance learning applications	Course/ program preparation	Student support services	Delivery: hardware and software	Course/ program evaluation, assessment & certification	Feedback devices
Instructor's Tools	Instructional Design Tools Presentation Tools Word Processing Course management tools	• Word processing • Electronic course content • Electronic mentoring and tutors • Electronic syllabus	• Extended campus WANS • Internet/WEB • Dial-up • Satellite • Compressed video • Cable modem • DSL	Electronic testing Feedback during class	Email News groups Electronic focus groups Electronic bulletin board Video network

Network Access to Educational Resources		• Extended campus
		• Internet access
		• FTP connection
		• Bridging services to connect students at multiple sites
			• Extended campus
			• Home/ office
			• Modem
			• Internet service provider
			• Student access for:
			  • Electronic courses
			  • Electronic syllabuses
			  • Electronic interaction		

E-Mail/ Interaction	Communication channels: • Students • Workgroups • News and user groups • Chat rooms	Enrollment services • Catalog • Admissions • Registration • Counseling/ Advising • Financial Aid • Security systems/ firewall • Marketing tools • Student records mgt.	Email FTP	Online Testing Assignments	
Library and Information Services	Resource libraries Print Media library Graphics library Software library	• Online public catalog • Digital library • Electronic reserves • Electronic syllabi • Online book/ materials ordering	WAN WEB Dial-up FTP		
Electronic Bookstore		Ordering texts, instructional materials	WAN Dial-up WEB		
Storage and Distribution Tools	Servers for templates and course content	WEB portals	On-demand access (servers and network) CD ROM/ DVD Video MPEG JPEG QuickTime REAL Networks Internet phone		

Adapted from Wilde, et al. n.d.

Table 18 itemizes indicators of technology high performance that promotes engaged learning.

How do all of these technologies impact the distance learning environment?

There is strong consensus in the research community that technology and technology-enhanced programs can support engaged learning at a distance. Researchers have identified many features of technology that are important to learning. This section presents indicators for identifying effective, high-technology performance, organized within seven categories:

1. Access to appropriate and diverse technologies and resources, both on campus and beyond campus;
2. Operability of the technology;
3. Organization of the technology, in terms of its location and distribution;
4. "Engagability," or the capacity of the technology to help students be engaged with learning;
5. Ease of use;
6. Functionality or the technology's capacity to serve learning needs (North Central, n.d.).
7. Reliability of the technology is as "failsafe" as possible (Institute for Higher Education Policy, April, 2000, p. 25).

Table 18: Indicators of High Technology Performance in a DL Environment

Variable	Indicators of High Technology Performance	Indicator Definition
Access	Robust connectivity	Learners have appropriate access to sufficient bandwidth in order to access multimedia content
	Ubiquitous	Technology resources and equipment are pervasive and conveniently available for individual learner use
	Designed for equitable use	All students who wish to participate in a DL environment have access to rich, challenging interactive learning opportunities
Operability	Interoperability	Capable of exchanging data easily among diverse formats and technologies
	Open architecture	Allows users to access third-party hardware-software
	Transparent	Users are not --and do not need to be--aware of how the hardware/software operates

Organization	Distributed	Technology/system resources have an appropriate balance between centralization and distributed, in order to provide maximum access
	Designed for user contributions	Users can provide input/ideas to the technology system as needed
	Designed for collaboration	Technology is designed to facilitate communication among users in diverse settings, using diverse technology systems
	Supports principles of good practice	Review and approval process ensures the appropriateness of the technology being used to meet the program's objectives
Engagability	Access to challenging learning opportunities	Technology offers or allows access to content and communication linkages that stimulate thought and inquiry
	Enables learning by participating	Technology offers opportunities for interacting and collaborating.
	Provides guided participation	Technology responds intelligently to user and is able to help manage new learning
	Access to student support services	Technology is available to support and enhance students' academic, personal and social growth within the DL environment
Ease of use	User friendliness/ user control	Technology facilitates use by learner and is free from overly complex interfaces
	Available training and support	Training, both in-person and online, is readily and conveniently available, as is ongoing support
Functionality	Diverse tools	Technology enables access to full diversity of tools to support teaching and learning
	Media use	Technology provides opportunities to use a variety of media technologies
	Promotes easy updating	Technology provides tools and templates that promote ease of updating content for learning. Use of course management tools is encouraged
	Supports learning skills	Technology facilitates development of knowledge and skills related to learning new content at a distance
	Supports learning for all kinds of students, including students with disabilities	Multiple media will be used to reduce barriers, and reach a broader set of students
Reliability	Fast	Technology is fast and allows viewing and downloading of multimedia content
	Limited or negligible downtime	Technology provides consistent

		service, without loss of time for learning

Adapted from North Central Regional Education Laboratory, n.d.

Campuses need to carefully consider whether they are well positioned to provide the requisite technological infrastructure to support DL courses and programs. The role of consortia and other alliances is growing in order to leverage the content provided by specialists in given fields. "To think that all campuses can or should develop their own [development and] delivery platforms is both inappropriate and unrealistic in this period of cost containment in higher education" (Hawkins, 1999, p. 10).

Integrating electronic learning into the traditional learning environment.

Most universities have a strategy for promoting their DL initiatives. Most also have an overall strategic plan for the institution in general. However, very few bring the two together and have a central policy for the use of technology both at a distance and on campus that is part of the overall university strategic plan (Fielden, n.d.). A recent report from the American Council on Education (ACE) encourages the development of such a central policy:

> The new distance education force transforming higher education may not be controlled by the traditional structures or providers of education or by traditional academic policies. Not only do the new forms of education portend a change for student populations, but also they will force faculty to develop new modalities of teaching and administrators to provide a new infrastructure for support. As a result, the advent of distance education is forcing many institutions to review and amend many of their existing policies and procedures (Parrish and Parrish, 2000, p. 1).

One of the core premises of this paper is that "distance learning should be viewed as a common tool in higher education, not as a separate--and esoteric--option" (McArthur and Lewis, 1998, part 2, p. 8). Complimenting that point is the view that higher education must begin to aggressively mainstream distance learning efforts in order to obtain appropriate support for the DL effort and to increase the overall responsiveness and flexibility of the learning environment within which DL functions (Sheely, et al. 2000).

Industry Canada suggests that distance education activities are already becoming mainstream.

> They are moving from the margin of institutional interest to the centre [sic]. The result is an inexorable process of convergence between the way education is provided on-campus and the way it is provided to learners elsewhere. In fact, it is arguable that the continued use of the term "distance education" has become dysfunctional in the sense that it fosters a perception of a dichotomy that no longer exists (Industry Canada, Current, 2001).

When there is a clear strategy for integrating electronic learning into the university strategic plan, one of four approaches articulated by Hanna (1998) is generally taken:

1. The use of technology to support distance learning and on-campus learning is seen as a natural extension of the core instructional competencies of a university and as a way to reach new, nontraditional students. In California, for example, academic institutions with already well-developed distance learning programs, such as the California State University Systems and Maricopa Community College, are among the leaders in marketing Internet-based distance learning as a core part of their mission.

2. The use of computers in teaching and learning, both on campus and at a distance, fits within the university's strong belief in student centered learning. For example, in 1996, the University of British Columbia developed a vision for technology-based teaching.

   > The vision included several detailed scenarios of teaching and learning for different types of learners. There were several key features in the vision: ...a mix of teaching models from programs delivered entirely in a face-to-face mode to courses available entire at a distance. It was envisaged [sic] though that students would take a mix of face-to-face technology based teaching over the life of a full degree program (Bates, 1997).

3. Universities with high student faculty ratios see the need to promote technological approaches to education, both locally and at a distance, in order to cope with increasing demand. For example, the University of Central Florida became aware of its enormous growth projections (nearly 80 percent) in 1999. The campus had limited physical growth potential. Thus, the Virtual Campus of the University of Central Florida was born as "an active response to the lack of facilities" (Threlkeld, 2000).

4. A defensive strategy is apparent in some cases, based on the notion that students expect technology-oriented approaches to distance learning as well as learning on campus. Top American universities, such as Harvard, Massachusetts Institute of Technology, Stanford, Cornell, Pennsylvania State University and the University of California at Berkeley, have mounted large-scale efforts and made major investments in order to take advantage of the online learning environment.

The traditional process for supporting any academic strategy is "bottom-up" (Pennycook, 2001). Courses and curriculum are initiated by individuals at the departmental level in response to changes in fields of knowledge, replacement and renewal of faculty, new modes or topics of research and certain external factors including societal demands. A new course or program is defined by individual faculty in the academic unit, approved by departmental and college curriculum committees, passed for approval by a university-wide curriculum committee and faculty senate, and ultimately signed off by the university provost. Along the way, some checks and balances are considered such as resource availability (i.e., faculty

expertise, space, technical support, library resources, etc.) to support the new course or program in question. When there are budgetary constraints, the question of accountability becomes more important. Historically, however, the academic approval process is based primarily on intellectual and scholarly merit at the local level. "Rarely is the full impact of curricular change examined on a rigorous cost-benefit basis at the faculty or institutional level" (Pennycook, 2001). Once the new course or program has been approved and students are enrolled, there are few if any mechanisms beyond student course evaluations to provide in-depth assessment of the value, quality, usefulness and cost-effectiveness of the offering.

When the goal of integrating DL programs into the higher education mainstream is considered, the solution may have to be "top down." Research reported by Foster (2002) identified "vision and top-down leadership" as significant features in the successful delivery of distance learning methods. Berge and Schrum (1998) concur.

> Key to the success of campus initiatives in technology enhanced learning and distance education is the support of campus leaders…The most important function of institutional leadership may be to create a shared vision that includes widespread input and support from the faculty and administration, articulates a clear educational purpose, has validity for stakeholders, and reflects the broader mission of the institution.

In an article in the December 2001 Syllabus Magazine, Lick offers the following challenge: "…if higher education is to succeed and thrive, it must re-create itself appropriately, using new technologies. This leads to the *number one* [italics in original] issue facing higher education today. The most urgent need is for effectively initiating, implementing and managing intentional, meaningful planned change -- change creation…As technology leaders, we first accept change as a vital partner and resource, and intentionally spend a significant amount of time and effort on understanding and coping with transformation change and the future" (Lick, 2001, p. 23).

Can traditional higher education academic processes respond effectively to support change involving distance learning technologies? Agre (2000) offers a provocative picture of higher education in which he describes the university campus as "an extraordinary assemblage of places--it is really a sort of metaplace that provides all of those places with a common administrative apparatus and physical plant." He points out that:

> networked information technology creates incentives, or more accurately it amplifies existing incentives to do two things: first, to standardize all of the places in the university world in which the same activities occur, and second, to interconnect those places so that eventually they merge. The great opportunity here lies in the efficiencies that are to be gained by standardizing and networking all of the parties…whose difference make no important difference to the local circumstances of a given campus… The need for standardization and efficiency suggest centralization of decisions about technology and governance at the same time as well as dependence on "top down" decision makers for system wide decisions impacting the DL environment.

Oblinger (1999) argues that local circumstances do not necessarily make it easy to support standardization and the efficiencies that follow, which are both necessary for DL to move into the mainstream of higher education:

> Few institutions will be able to create a distributed learning environment overnight. Institutions will differ in their goals and will have different starting points for distributed learning initiatives, so components need to be separable. If for no other reason than expense, distributed learning initiatives tend to be implemented in phases. Separate components, no matter when they are brought on-line, must be able to work together. When snapped together, these components must function in an integrated manner (p. 8).

The emphasis on components suggests that the university has assumed the responsibility for providing service and activities well beyond direct instruction (Newman and Couturier, 2001, p. 4). Agre (2000) highlights what he characterizes as the "informational substrate of the university: the wide range of generally uncoordinated services that provide information support of one kind or another to the university's teaching mission." These include library resources, the course catalog and schedule, course information such as the syllabus and course handouts, the campus bookstore, and the university helpdesk, and various student services functions such as advising, scheduling, financial aid and the like. Technology offers the possibility of "unbundling"-- taking apart -- various educational functions and roles within academic institutions (Oblinger, 1999; Duderstadt, 1998; “Future,"1999; Baer, 1999; Industry Canada, Current, 2001).

For example, distance learning encourages the unbundling of different instructional elements: content development, course delivery, testing and evaluation, and administrative functions: registration, payment and student record keeping. "Traditionally, each academic institution has provided all these services for every area in which it offers instruction. E-learning makes it easier to separate them, so that an institution can concentrate on the components and substantive fields in which it does best (Newman and Couturier, 2001, p. 4).

Twigg (2001) points out that the unbundling of services poses new challenges for determining which capacity and resources are essential and which can be outsourced . Selected functions can be standardized, outsourced and dispersed across multiple individuals and institutions in the DL environment. "Once functions are unbundled, the individual components can be repackaged and reshuffled in unique combinations to suit an individual's needs" (Oblinger, 1999, p. 6).

Many of the important trends and issues in the DL world today relate to the concepts of unbundling and standardizing of higher education processes for use in the DL environment (see Dirr, "Distance," 1999 in Farrell, Development, 1999; Wieland, n.d.). Oblinger outlined processes that are candidates for unbundling in her 1999 guidebook on distributed learning and they can be seen here in Figure 19.

Figure 19: Functions in a Distributed Learning Environment

Content Development	Content Management tools Text, video, graphic, image, audio, multimedia
Content Repository	Acceptance processing Copyright clearance Object store Content catalog Access management
Integrated Services	Advising Registration Financial aid Student records Course catalog
Administrative	Library management Book store Student information system Class scheduling Financial systems
Delivery	Student and instructor tools Collaborative applications Delivery applications Course materials Student and instructor work areas Research support Class management support
Assessment	Testing applications Assessment support tools Student portfolios

Oblinger, 1999, p. 11

Some of the trends influencing the "unbundling" process are:

1. The evolution of "standards based learning systems" that allow content to be defined in small objects with associated learning resources, activities and assessment strategies which can then be shared among institutions that adhere to similar technical standards.
2. Associated with the above is the development of content standards as a means of quality assurance.
3. The evolution of new organizations that specialize in providing key functions such as development of instructional materials, and provision of technical delivery systems, learning assessment…and learner support services. (Industry Canada, 2001, Current, p. 6).

Each of these points will be discussed in turn.

(1) Standards-based learning systems

Perhaps of greatest significance currently in the distance learning environment is the emergence of what is being referred to as the development of standards-based learning objects (Hodgins and Conner, 2000; Schocken, 2001; Babu, n.d. Wiley, 2002). The vision "involves the organization of content into small objects in the form of learning outcomes and associating them with learning resources, activities and assessment strategies" (Industry Canada, Current, 2001, p. 28). These objects can then be tagged and managed in a learning object repository and "assembled into learning modules or courses as needed. Learning objects can be thought of as learning content that is as granular as a 'text tip' or as involved as an 'interactive Java applet' lesson" (Mark, n.d., p. 3). The concept of "granular" learning objects is the driving concept behind some on-line learning environments. Through the process of creating these learning objects, a method for preparing digital learning resources and courses for use, reuse, re-purposing and electronic commerce is created. The structure of the educational materials is linked with a standard classification system that facilitates the storage and retrieval of the content by any institution that uses the same standards (Porter, 2001).

The development of a learning resource classification scheme is leading to the use of open specifications and a basic vocabulary for describing learning resources called metadata (see Porter, 2001; Yanosky, 2001, Brennan et al., 2002). "Metadata is simply a formatted file containing text that provides descriptive information about content. This information may include the format, size, delivery requirements, authorship, ownership, version number, instructional role, instructional characteristics, and type of interactivity" (Hamel and Ryan-Jones, 2002). Sometimes an industry or educational group agrees upon a format and set of metadata elements that captures the most important characteristics of the content in a "coherent and unitary fashion… This is usually called the 'core metadata' for that industry…there are numerous industry metadata standards" (Hamel and Ryan-Jones, 2002). For example, the Dublin Core, started in 1994, is a metadata framework for web resources in use by formal resource description communities such as museums, libraries, government agencies and commercial organizations (Babu, n.d.). Items retrieved through the use of metadata can be re-aggregated according to the needs of a group of learners, and the material can be reproduced in print, CD-ROM, or Web-based delivery formats as appropriate (Industry Canada, Current, 2001).

The major organization developing and promoting open specifications for facilitating online distributed learning activities is the Instructional Management Systems Group (IMS) Global Learning Consortium (http://www.imsproject.org/), begun in 1997 (Schocken, 2001, "Standards Update…" 2002). Over the past five years, the Consortium has grown rapidly to include over 600 institutional members and "now represents a wide range of systems vendors, information providers and learning content providers" from the U.S., Canada, Europe and Australia (McLean, 2001, p. 1). IMS has a number of working groups, organized into five general areas of concern:

- Content, including course materials, assessments, resource integration, online help and supplements.
- Management functions, such as access control, session management, tracking student progress, control over the online learning environment, and security.
- Profiles of students and instructors; these include personal, performance and preference information.
- External interfaces to campus services such as electronic commerce, back-office, full text indexing systems, digital library services, and databases.
- Metadata, to label materials for easy identification and retrieval by search software. (National IMS Project, 2002)

IMS activity gained considerable momentum in 2000 and 2001 due to the huge investment by the U.S. Department of Defense (DoD) and the White House Office of Science and Technology for a complimentary program to develop standards to enable reuse and interoperability of learning content (Hays, 2001; McLean, 2001; Sonwalkar, March, 2002). This effort, also begun in 1997, was called the Advanced Distributed Learning System (ADLS) (U.S. Department of Defense, 1999). Now called Advanced Distributed Learning (ADL), it is currently under the jurisdiction of the Department of Labor.

> The purpose of ADL is to exploit existing network based technologies; create platform neutral, reusable courseware and content to lower costs; promote widespread collaboration to satisfy common needs; enhance performance with emerging and next generation learning technologies; develop a common framework that drives the commercial off-the-shelf cycle; establish a coordinated implementation process; and develop common standards and guidelines (Brown and Meachen, 2000). (See www.jointadlcolab.org)

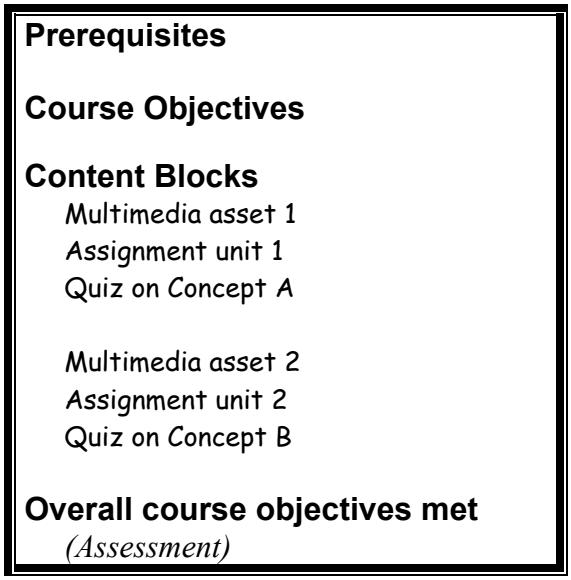
ADL efforts ensure that all branches of the U.S. military can "use, exchange, manage, track and re-use their learning technologies, content and data no matter the source or application" (Massie, 2002, p. 11). Current ADL documentation is called SCORM (Sharable Courseware Object Reference Model). SCORM provides a framework upon which anyone can develop models of learning content and delivery so that content, technology and systems can "talk" to each other, thus ensuring "durable, reusable, interoperable, and accessible courses for defense and industry training" (Sonwalkar, March, 2002, p. 2). The model is "intended to enable more flexible interoperability among diverse systems, including

- The capability to launch content that is authored using tools from different vendors and to exchange data with that content;
- The capability for products from different vendors to launch the same executable content and exchange data with that content during execution; and
- The capability to move an entire course or pieces of that course from one LMS [learning management system] to another (course interchange) (“Research Summaries,” 2000).

There is currently a Co-Laboratory Network, made up of three independently supported labs, including the academic co-lab at the University of Wisconsin-Madison, which links to an academic network of 37 institutions. The goal of the ADL network is to encourage collaboration among members in order to incorporate the "best of the best" of current and emerging standards that other organizations have developed (Carr, 2000; "Research Summaries," 2000; "About ADL," 2002; Sonwalker, April 2002).

Through the use of IMS Protocols, and specific implementations, such as SCORM, the potential structure of an online course is identified. For example, the global properties node in the SCORM model contains information about the course as a whole, such as prerequisites and course identification. Other typical course components, such as references, exams, and lesson objectives are also included as distinct components. "In IMS and SCORM, a course and the elements surrounding a course, such as students, grade books and prerequisites, are depicted as interacting and inter-related objects" (Downes, n.d., p. 15). See Figure 20 for a generic SCORM course structure model.

Figure 20: A SCORM Generic Course Structure



Sonwalkar, April 2002

The third and newest standards initiative is the Open Knowledge Initiative (OKI), led by the Massachusetts Institute of Technology and Stanford University, and funded in part by the Andrew W. Mellon Foundation (MIT Open Knowledge Initiative, 2001; Centre for Educational Technology Operability Standards, 2002; Gilbert and Long, 2002; Sonwalkar, March 2002) (see http://web.mit.edu/oki). Begun in 2001, the team released its first series of software standards in March of 2002 (Young, March 11, 2002). It is hoped that its technical standards, known as APIs (or application programming interfaces), will be used not only by universities, but by commercial course-management producers such as Blackboard or WebCT. "This could make it easier for colleges to create their own software that would

work seamlessly with the course-management software they have already purchased or built" (Young, March 11, 2002). MIT is developing its own open source course management platform, to be released in June of 2002, which will incorporate key OKI technologies (CIO, 2002). The project is being closely watched by university administrators. The OKI initiative is seen as "a possible alternative to expensive course management systems sold by Blackboard or WebCT" (Young, March 11, 2002).

Leaders of all three initiatives have announced their intentions to work together and "cooperate to close the gap between innovative pedagogical technology and production learning resources…By working together to facilitate the development of a general technical framework, the groups will pursue complementary work plans and improve the impact of their unique resources and capabilities" (MIT Open Knowledge Initiative, 2001).

All of these efforts "are intended to encourage interoperability of both the educational content and the underlying technology that will support the deployment of online courses" (Sonwalker, April 2002, p. 3). They are working closely together to promote standards for learning technologies. "All are trying to achieve essentially the same overall objective, but each one has a specific expertise it brings to the host of issues that need to be addressed for the future of learning technology standards" (Sonwalker, April 2002, p. 3). See Figure 21 for a summary of who is doing what to develop interoperability standards.

Figure 21: Organizations Developing Interoperability Standards

	IMS	ADL/SCORM	Dublin Core	OKI
Metadata	Yes	Yes	Yes	
Content	Yes	Yes		Yes
Enterprise	Yes			Yes
Learner Information	Yes			Yes
Question & Test	Yes			
Accessibility	Yes			
Learning Design	Yes			Yes
Collaboration				
User Requirements	Yes			

Adapted from Centre for Educational Technology Interoperability Standards, 2002.

(2) Content Standards

Creating learning solutions is about a lot more than just how to format content objects. The development of standards-based learning systems is leading to the need to produce content standards as well. "Content is essentially the material used to convey the subject matter. It may include text, graphics, audio, some form of interaction and concept application. Content is not tied to any code and may be created using any number of tools from Microsoft Office to Dreamweaver" (Brennan, et al., 2001). Some analysts see that the development of high quality digital course content is the key issue in distance learning currently (Gifford, et al., 1999; Harris and Zastrocky, 2000; Janicki and Liegle, 2001; Downes, n.d.).

There is an expectation that faculty members who teach DL courses will develop their own content (Zastrocky, 2001). Many institutions are concentrating on the delivery aspect of the process, however, constructing robust and reliable hardware and software systems for academics to use, but investing little in content development (Sheely, et al., 2001). The development of learning resources for the DL environment is particularly expensive, with costs running three to ten times those of traditional courses (Yanosky, "Higher Education," 2001). Forty-three percent of institutions cited in a Merrill Lynch study completed in 2000 cited program development costs as a deterrent to offering distributed learning courses (Moe and Blodget, 2000 p. 184). It follows that "…institutions have strong incentives to pursue economies of scale through content exchange" (Yanosky, "Higher Education," 2001, p. 1).

A major challenge in considering content exchange is in evaluating the quality of the content available on the Web, by considering its contextual accuracy, pedagogical soundness and ease of use (Hanley and Thomas, 2000). MERLOT (Multimedia Educational Resource for Learning and Online Teaching) is a project that addresses these challenges through a cooperatively developed, free, Web-based resource that faculty can access to find digital learning materials with evaluations and guidance for use (Multimedia Educational Repository for Learning and Online Teaching, 1997).

Begun in 1997 by the IMS, MERLOT uses a peer review process to evaluate instructional technologies as well as well-defined discipline-specific standards against which these learning materials should be assessed (Eastman-Mullins, 2001). As of 2001, MERLOT had a collection of over 5000 materials categorized by subject area (MERLOT, n.d.). Well-defined criteria for evaluating "learning objects" (typically Web-based teaching modules) are in place. Materials are rated on a scale of 1 to 5, and in three separate categories, namely quality of content, pedagogical effectiveness and technical usability. "This nuanced three-pronged approach to rating materials is invaluable when it comes to choosing materials for a concrete learning situation in the real world, where conditions such as user computer literacy or bandwidth limitations can vary considerably" (MERLOT, n.d.)

A Dartmouth College newsletter highlights the strengths and weaknesses of MERLOT as a teaching tool. Its strengths lie in its processes for cutting through "the clutter of Web-based materials via comprehensive indexing and searching" and selecting appropriate materials through the adoption of quality control measures and evaluation mechanisms (MERLOT, n.d.). Its weaknesses relate to "the relatively small number of peer and user reviews" of learning objects listed, only 3 percent as of June 2001 (MERLOT, n.d.). (For further information on MERLOT, click on "About MERLOT" at www.merlot.org)

Another organization that supports the development and use of high quality digital content is the SMETE Open Federation. Funded by the National Science Foundation, its primary mission is to establish universal access to digital resources supporting teaching in Science, Math, Engineering and Technology Education. Headquartered at Berkeley, and begun in 2001, it plans to establish, maintain and grow a digital library of high quality resources that responds to the educational needs of end users (www.SMETE.org).

A third initiative, announced in April of 2002, focuses on the use of a comprehensive set of standards to be used to develop and evaluate the quality of online courses. Michigan Virtual University has developed a set a guidelines so that "potential course developers can create online courses that meet standards of technological functionality and appropriateness, usability and instructional design (i.e., is the course pedagogically sound)" (Michigan Virtual University, 2002). The standards and evaluation tool are available without charge and can be found at http://standards.mivu.org/.

Despite the efforts of coordinating bodies such as IMS and ADL, "there is still no widely implemented set of standards for learning objects… existing learning object repositories tend to be idiosyncratic, cataloging and indexing learning objects according to their own criteria" (Industry Canada, Models, 2001, p. 27). Ongoing development projects identified by Hamel and Ryan-Jones (2002), such as Microsoft's Learning Resource Interchange (Microsoft 2000) and the standards project of the Institute of Electrical and Electronics Engineers (IEEE), suggest that there is "considerable industry momentum" for supporting standards-based tool sets for course development (Industry Canada, Models, 2001, p. 28). Both WebCT and Blackboard have implemented processes to become compliant with IMS metadata specifications ("WebCT Announces," 2001; "Interoperability Pilot," n.d.).

Digital content is also within the purview of a number of other competing ventures and businesses. Dickinson (2001) has summarized them to include the following:

- Individual subscription: access to an online collection of digitized works on a monthly subscription basis.
- Digital archive: access to a single publisher's holdings on a subscription basis
- Customized texts: construction of course readers and customized textbooks. Access is purchased by the student.
- E-learning course packs: course readers offered through e-learning platform vendors and through alliances with course management tool providers (i.e., Blackboard, WebCT).
- Digital university library: digital works accessed through the institution's library.
- Online textbooks: digital versions of traditional textbooks.

In 1997, a symposium in Boston sponsored by the National Learning Infrastructure Initiative (NLII) identified the desirable characteristics of digital content to support teaching and learning at a distance. These characteristics include:

- The ability for users to pick and choose and used pieces as needed, and to combine and re-combine content, as necessary and desired;
- The content is scaleable, designed to be combined and used in different ways for more than one purpose to meet different needs;
- The content relies on the use of standard hardware platforms.
- The content is disintermediated, "that is, capable of being used by learners to a large degree without human mediation" (Twigg, , 1997, p. 7).

Support for these desirable characteristics implies content development that is interoperable, reusable, up-to-date and customizeable for students. These standards also suggest durability of content and the technology for disseminating it, avoiding obsolescence through constant refinement of both software and hardware (Massie Center, 2002, p. 8).

Challenges for those who wish to use digital materials include undeveloped archiving technologies and policies for content available only in e-book or other digitized formats, lack of format standards, intellectual content ownership issues, and required changes in campus services to retrieve content (EDUCAUSE, n.d.). In addition, "research-based learning -- such as that required in any course above the introductory level in the sciences, social sciences, arts or humanities--requires free access not only to 'enough' content, but, at least in principle, to everything published on a topic" (Dickinson, 2001, p. 1). Thus, while the subscription or "course pack" content models might make good commercial sense, the model that is most likely to have staying power is the "digital library" model, which most efficiently resolves the issue of access (Dickinson, 2001; Muramatsu and Agogino, 1999; Roes, 2001).

(3) Organizations providing key functions

Higher education software can be broken into two segments: applications that automate administrative services and applications that enable pieces of the learning process (Smith, 1998). The more robust market is the one for administrative systems, with large multi-million dollar systems that manage student registration, record keeping, financial aid, scheduling and other administrative functions. Because of their size and scope, administration applications are referred to as enterprise applications.

The learning content management market is much more fragmented, with commercially companies like Web CT and Blackboard competing with "do it yourself applications" and shareware. Typically, these tools enable professors to post course information on the web, link to educational resources, provide chat room capability and discussion board applications and the like. These applications are not large, complex or particularly scalable (Smith, "Higher Education," November 1998).

The potential value of learning content management technologies increases as they are combined with administrative systems enterprise applications to provide a complete DL environment (Hanson, 2001). For example, there is the need for methods to support interaction between one part of a DL system with another, "the assessment system needs to tell the student record system that student x took part in the exam and got an 'A'. This is the 'glue' that holds learning systems together" (Wilson, 2001). EDUCOM identified three main obstacles for providing effective enterprise level e-learning environments. These are:

- Lack of support for the collaborative and dynamic nature of learning.
- Lack of standards for locating and operating interactive platform-independent materials.
- Lack of incentives and structure for developing and sharing content. (Hazari, 1998)

At the moment, the first two items are being addressed by a variety of e-learning companies that have emerged to serve the online learning requirements of colleges and universities. Some companies focus solely on the technology platform, while others offer the entire learning solution including content, technology, implementation and deployment (Moe and Blodget, 2000, p. 185-192).

Lawrence (n.d.) has prepared a typology of organizations and businesses involved in serving the technology requirements of college and university e-learning efforts. These include companies that provide course management systems, for-profit universities, IT companies, publishers, higher education profit spin-offs, among others. Moe and Blodget (2000) identify the types of functions being met by these companies: admissions, institutional portal, IT department support, support for administrative functions, and support for faculty functions, student academic life, student campus life, career services, and alumni functions (p. 18).

Basic course management systems are provided by companies such as Blackboard and WebCT. These companies are identified by Lawrence (n.d.) as corporate-university joint ventures. The products offered by these companies provide a set of mutually compatible services within a proprietary framework. "Their distinguishing feature is that they enable individual instructors to develop and deliver online educational content with little or no expertise in HTML or other Web programming languages" (Smith, et al., 2001, p. 12). Development tools are built into the course management system environment, enabling instructors to create Web pages, upload documents, design online quizzes and tests, and add such features as email, threaded discussion, and chat. Course management tools support collaborative online activities that are comparable in interactivity to that available in traditional face-to-face classrooms (Cravener, 1998) as well as a standard interface for developing and distributing course content (Hazari, 1998).

> In a face-to-face classroom…learner support is the provenance of the individual teacher…The teacher … rarely differentiates between direct instruction in a knowledge domain and support of his or her students: for example, he or she may give tips on scheduling, study or mnemonics which assist in rote learning tasks, or advice about career choices and further education opportunities (Ryan, 2001, p. 71).

Through the use of course management tools, the faculty member retains control of the teaching/learning environment, much like in the traditional classroom. These tools empower faculty members, as they can actually design and repurpose content themselves. They "put the instructor in the driver's seat, allowing him or her to design and deliver courses to his or her own specifications and own personal style" (Moe and Blodget, 2000, p. 188). Course management system products also contain management tools that include the development and maintenance of class rosters and tracking of students. Moe and Blodget (2000) identify these kinds of systems as "bottom up" applications (p. 184).

A number of vendors are expanding the functionally of their products to emulate the campus environment, by providing a broader range of services, including online registration and linkages to student support services and the library. WebCT's new product, VISTA, recently

announced, moves the company from course management to "academic enterprise system" providing support not only for content management, but for a personalized e-learning gateway for students (WebCT Vista, 2002). Through this effort, the company is positioning itself to compete more comprehensively with Blackboard, who, with its merging with Promethus, an open source course management platform developed at George Washington University, is also providing universities with a customizable, more integrated, enterprise-wide online platform (Olsen and Arnone, 2002; Moe and Blodget, 2000, p. 189).

For schools that are looking for a more comprehensive, integrated enterprise-wide solution, there are total e-learning outsourcing companies such as eCollege, Embanet and Convene. For example, a product called Campus Pipeline is a

> fully integrated, enterprise wide information portal and application platform that effectively links students, faculty, alumni and administrators. In essence Campus Pipeline webifies the entire college campus, bringing basic functions such as registration, payment and admissions online. …students can access e-mail, register for classes, conduct online research and threaded discussions, apply for jobs and buy textbooks …faculty can create course syllabi and assignments online, conduct online office hours and facilitate secure chat rooms…Perhaps the most compelling feature of the Campus Pipeline solution is that the platform is completely integrated with an institution's back office software systems" (Moe and Blodget, 2000, p. 186).

Moe and Blodget (2000) classify Campus Pipeline as a "top-down" solution, since it links students, faculty, administrators, and alumni into one integrated system (p. 184). These companies "design a comprehensive learning solution specifically tailored for schools based on their needs…" (Moe and Blodget, 2000, p. 190).

As course management systems such as Web CT and Blackboard expand their functionality, application overlap with broader "enterprise solutions" such as Pipeline is unavoidable. One of the challenges facing universities and colleges is to decide which pieces and parts to buy, build or partner to acquire and which components to use in their DL environment (Hawkins and Morley, 2002, p. xii).

With the increased functionality offered by all of these companies, there has also come a corresponding substantial increase in price (Smith et al., 2001, p. 12; Olsen, December, 2001; Moe and Blodget, 2000, p. 184). In response to the price increases of commercial products as well as the desire to be responsive to the needs of end users, a university may decide that it is effective to acquire the tools and other resources needed to develop an in-house solution. In a survey completed by Gartner Research in 1999 of 45 higher education institutions in the U.S., 60 percent of deployed e-learning systems were developed in-house, suggesting that there is a preference for local development, when possible (Yanosky, 2000).

An alternative response, the open source approach, is also seen as a way of retaining control over results. "Ideally, under the open source approach, a large community of capable individuals contribute to improvements in that source code, while a quality control system

manages the interactions" (Gilbert and Long, 2002). The Open Knowledge Initiative (OKI), under development at M.I.T., has already been discussed in this paper. The goal is to cooperatively develop Web-based tools that can work together for online learning. The system is being developed with an awareness of "security, scalability, sustainability, flexibility, and standards issues (Smith et al., 2001, p. 13).

"Proponents of open source software (OSS) often emphasize the technical benefits of using this category of software as well as the low or negligible initial costs to acquire it. In addition, people who use OSS highlight the fact that using OSS is free from the constraints of complex licenses that control how commercial software can be used" (Rusten and Moses, 2002, p. 2. And perhaps most significantly, while the value of outsourcing a DL solution may be "compelling from an institutional and efficiency standpoint, some companies have experienced some resistance from faculty members who are not comfortable" with outsourcing technology solutions for distributed learning (Moe and Blodget, 2000, p. 190). Thus, efforts such as OKI provide institutions with opportunities to grow their own solutions in cooperation with others.

However, when considering the total cost of ownership of a locally or cooperatively developed system or product, the cost may be prohibitive (Hawkins and Morley, 2002, p. xii). For example, the University Michigan announced in April that it was closing down its homegrown portal, my.umich.edu, on June 30 of this year, after little more than a year in which it has been offering personalized Web space to its students for email, calendars, transcript checking, posting notices, and bill paying. "Campus officials say the university can no longer sustain such a complex and expensive software development project on its own" (Olsen, April 11, 2002).

Learning and Student Services Online

In 1998, the Western Cooperation for Educational Telecommunications (WCET) conducted a survey of student services for distance learning. The WCET report covered more than 400 institutions representing the 15 state western regions. At that time, online programs were in an "early adoption" state, and a majority had not adapted student services for an online environment (Smith, 2001). In 1999, the National Academic Advsing Association (NACADA) adopted "Standards for Advising Distance Learners," recognizing that "providers of distance education must offer a minimum set of core services which assist distance learners in identifying and achieving their educational goals" (National Academic Advising Association, 1999). The standards recommended that DL programs had to provide DL students with points of contact for admissions, registration, degree audit, course requirements, financial aid, costs and payment, curriculum and student/faculty interaction.

Another trend worth noting is the 'commodification' of educational provision (Weigel, 2002, chapter 2) and the emergence of the concept of student as client or consumer (Ryan, 2001, p. 73; Husmann and Miller, 2001). For example, The Council for Higher Education Accreditation's 1998 report on Assuring Quality in Distance Learning states: "The student is regarded first as a client of the organization, and the educational activities that the client desires predominate in the design and implementation of [distance learning] programs"

(Phipps, et al., 1998, p. 6). This institutional perspective puts the student at the center of every interaction. "Service perspectives are shifted 180 degrees when the institution views all services from the external perspective of the student/customer instead of the internal perspective of the institution" (Burnett, 2002).

> …the institution in supporting the academic to adopt online communication media must review all of its operating procedures and structures to ensure that the support is holistic for 'without such change, the academic who seeks to embrace the online educational world is left stranded' and the online learner will not receive an 'effective service delivery'… (Dunkin, 2000, quoted in Templeton, 2001).

A significant portion of DL literature looks at both the student environment for learning as well as student support services that are provided at a distance, and suggests a profile of the type of student who is likely to be a successful DL client. For example, Brint, in his analysis of online learning issues, points out that in most instances DL methods consist of creating "highly individualized asychronistic, learning programs accessible on demand. This form of delivery is said to particularly aid the growing numbers of *non-traditional* (my emphasis) students whose lives require that learning be less and less dependent on one's ability to be in a specific place at a specific time" (Brint, 2002, p. 1).

The profile of the successful distance learning student as a "non-traditional" student is supported by a 1998-1999 University of Illinois Faculty Seminar which categorizes the types of student who might take online courses (University of Illinois Faculty Seminar, 1999). The "traditional" student is young (often right out of high school), full-time or part-time, but taking a significant number of courses, and attending most classes on campus, face-to-face. In contrast, "mature" or "nontraditional" students are generally older, working full time, and may already possess one or more degrees. By virtue of their life situations, nontraditional students are generally more place bound than their more traditional counterparts and are likely to take a large number of courses at a distance. The Seminar recommends that a complete online degree program should not be developed for traditional students, "because such students need the kind of personal socialization that can come only from face-to-face instruction" (Young, January 14, 2000, p. 2). Rather, distributed learning opportunities should target the "lifelong learning" cohort (25 years and up) because this group of students has already been socialized and so can achieve success in the DL environment (University of Illinois Faculty Seminar, 1999, p. 22).

It follows that as the distance learning enterprise grows, important questions continue to be raised about the ability of colleges and universities to provide socialization opportunities for students at a distance. The kinds of student services that have expanded on many campuses, including activities that, for example, encourage appreciation of diversity or provide leadership experiences, are now considered to be significant in the DL environment as well. "The types of institutional support needed for online learning will be similar to those provided for more traditional forms of learning, e.g. administration, finance, learning support, guidance and counseling, learning/library resources and so on" (Templeton, 2001,

chapter 7, p. 4-3). For Potter, such support "includes the many forms of assistance that are designed to remove barriers (situational, institutional, dispositional and informational) and promote academic success. (Potter, 1998, quoted in Ryan, 2001, p. 76).

However, trying to use existing models of student support services can prove to be problematic. "Adapting existing support systems to meet the demands of online learning is a major challenge that needs to be addressed by institutions" (Templeton, 2001, chapter 7, p. 4-3). The form and delivery mechanisms of support are changing, and there needs to be a revision of concepts about what it means to be part of a campus community. The current trend for DL students is towards an integrated portal system, which supports teaching, learning, administration and management and provides

- A Web interface with courseware and required information about courses
- Increased and easier communications with faculty members
- On-line access to grades, financial aid information, class schedules and graduation checks
- Access to the communities of interest within the university
- Increased lifelong learning opportunities (Gleason, 2001; Daigle and Cuocco, 2002, p. 113-114)

Students are encouraged to interact with each other and with faculty and staff at a distance both in and out of class. The Web is used as a flexible and highly functional medium for promoting interaction between students and faculty and other professional staff and with each other (McArthur and Lewis, 2000, p. 6). Virtual office hours, shared work spaces, Internet discussion groups and forums are being created to provide environments for interaction (Klockner, 2000; Garito, 2000). Astin states that "the single most powerful source of influence on the undergraduate student's academic and personal development is the peer group" (Astin, 1993, cited in Williams, 2000, p. 1). Particularly in the distance environment, the importance of students' support for each other "to keep them going" cannot be underestimated (Gilbert, 2000).

Yet, it is the case that "the full benefits of the often discussed 'student-centric' learning model are yet to be realized" (Chaloux, 2002, p. 2).

> At present, much of what is provided in the form of learner support is systems-driven rather than student-centered. For example,…EDUCAUSE's criteria for the Award for Systemic Progress in Teaching and Learning 2001 advises that applicants must give evidence that the system is learner-centered, but there is no explicit mention of student support. (Ryan, 2001, p. 75).

Ryan (2001) provides an excellent summary of the form and content of needed online support services for students. Figure 22 outlines her suggestions as well as others from a variety of sources in the literature cited below.

Figure 22 Forms and Content of Online Support Services and Information

Pre-Enrollment	• Authoritative listing of accredited online providers. • Range of courses available at individual institutions, including prerequisites, special requirements, etc. • Self-assessment checklist • Technology requirements • Online purchase of textbooks • Library access and borrowing privileges • Extended helpdesk hours • Portal for "one stop shopping" for admission, tuition, financial aid and instructional support • Communication links through email, chat rooms and bulletin boards • Telephone based advising • Transfer of credit/prior learning assessment
Post-Enrollment	• Online enrollment • Subject content guides • Learning resources required • Contact names • Orientation • Information literacy skills assessment • Access to digital resources • Independent learning skills • Library resources and reference service "at a distance" • Timely feedback from instructor • Continuous communication and contact between students and staff • Frequently asked questions page • Texts online • Grade tracking • Links to administrative systems • Portfolio development
Post-Graduation	• Career services • Continued access to library resources • E-mail
Students with special needs	• Accommodation for disabilities • Website usability

Adapted from Ryan, 2001, p. 77-84. See also York, 1993, Sherron and Boettcher, 1997; Abate, 1999; Carnevale, 1999; Dirr, "Putting Principles into Practice," 1999; Brigham, 2001; Dalziel and Payne, 2001.

A number of research projects have focused on identifying the range of online student services needed to support students at a distance. In 1997 the Western Cooperative for Educational Telecommunications (WCET) received funding from the Fund for the Improvement of Post Secondary Education (FIPSE) to help western colleges and universities improve the availability and quality of support services provided to distance education students. One of the significant products to come out of the project was a report summarizing the student services being provided to distance education students by institutions of higher education (Dirr, 1999, "Putting Principles into Practice").

Also in 1997, the American Productivity and Quality Center (APQC) collaborated with the State Higher Education Executive Officers (SHEEO) to produce a comprehensive summary of best practices, Creating Electronic Student Services. In 1999, IBM and the Society for College and University Planning (SCUP) sponsored another benchmarking series of best practices case studies (EDUCAUSE, Institutional Readiness, 2001).

WCET received a follow-up grant in February 2000 under the auspices of the U.S. Department of Education Learning Anytime Anywhere Partnership (LAAP) program. The grant's purpose was to develop online student services modules and a set of guidelines for other institutions to use (Western Interstate Commission for Higher Education, 1999, p. 2; Krauth and Carbajal, 1999). The Guide to Developing Online Student Services, the final product of the LAAP grant, is intended to "help higher education institutions develop effective online approaches to delivering student support services" (Krauth and Carbajal, 2001, p. 1). The most recent compilation of best practices in online student services comes from the Instructional Telecommunications Council, which in 2001 published a volume on student services in distance education (Dalziel and Payne, 20001).

Quality Assurance

As distance education proliferates in response to increases in demand as well as to an increase in the number and variety of organizations offering DL opportunities, “American higher education is struggling with the question of how to ensure that students learning through these means receive the same educational quality as traditional on-campus students, if not better” (Broad, 1999). In considering this question, Lampikoski (1995) points out that “judgments about quality differ according to whose views are being sought. Consequently, the fundamental question in the context of quality is ‘quality for whom and in whose interests?’ (p. 1). For example, key stakeholders in the distance education environment have been identified by a number of authors. These stakeholders include students, the institution itself, faculty, student services personnel, and external oversight bodies such as the government, funding agencies, and accreditation bodies. Each of these groups has a different perspective on the quality issue and how to serve the needs of constituents (Lampikoski 1995; Robinson, B., 1995; Broad, 1999; Garrison and Borgia, 1999; Yeung, 2001). “Any distance education system incorporates many different elements and processes and the actual degree of importance given to these varying components depends upon which interest group is going to interpret quality” (Lampikoski, 1995, p. 1).

Ehmann et al., (2001) suggests that quality assurance needs to be addressed at four different levels: the institution and support infrastructure; the course (faculty/school/department); the module (or individual course unit), and the individual learning experiences of the students. Harvey, et al. (2001) summarize a variety of evaluation strategies to be carried out for different audiences and for different purposes, including: formative (design and implementation); summative (outcomes); interpretive (observational); and integrative (educational intervention). The most common form of evaluation of DL courses and teaching relies rather heavily on student questionnaires, even though recent research suggests that the instruments used "are not geared to evaluation of online teaching and learning" (Harvey et al., chapter 5, 2000, p. 2-8).

Reviews of contemporary approaches to evaluation and appropriate areas of application are suggested by Oliver (1997) and Oliver and Harvey (2000) as cited in Harvey et al., (2000, chapter 5, p. 2-9). Action research is suggested as a fruitful approach as it "brings together stakeholders from different disciplines for the purpose of conducting research that will inform strategies for ongoing development… The action research process consists of repeated cycles of planning, action, observation and reflection" (Harvey et al., 2000, chapter 5, p. 2-12). An example of an action research methodology in the distance learning environment is The Flashlight Project (www.tltgroup.org/programs/flashlight.html) The simile "Flashlight" is used to describe the process of evaluation:

The act of program evaluation in education is like using a small, dim flashlight to decide what sort of animal might be in front of you in a pitch black cave…The relative brightness (rigor) of the flashlight (evaluation) is less important then where one points the beam (asking the right evaluative question). Each evaluation question is the equivalent of pointing the tiny beam in a particular direction and waiting to see what walks into the light. (Ehrmann, 1997).

Started in 1994 with a planning grant from the Fund for the Improvement of Postsecondary Education (FIPSE), additional funding for development of Flashlight evaluation tools was received from the Annenberg/CPB Project (Ehrmann, 1997). Now under the sponsorship of the American Association of Higher Education, the major focus of Flashlight currently is the Current Student Inventory (CSI) which allows educators to design their own quality assessments of their uses of new technologies to support teaching and learning (Brown, n.d.; Harvey et al., 2000). Other assessment tools provided by Flashlight include the Technology Cost Analysis Handbook, the Evaluation of Education uses of the Web in Nursing Program Benchmarking project, the Evaluation of the Use of Powerpoint and other Presentation Software in a Course, and two tools now under development: the Current Faculty Inventory (assessing faculty use of technology in teaching) and the Evaluation of Online Students Services (EOSS) Template ("Flashlight Program," n.d., Ehrmann and Zuniga, 2001).

“Many members of the higher education community approach the issue of quality assurance in distance learning not as a desired end but as a problem that needs to be solved” (Twigg, Quality, 2001, p. 3). For example, despite over 400 studies reporting findings to suggest that distance learning courses do not produce significantly different levels of achievement than their more conventionally offered counterparts (see, for example, McCollum, 1997; Russell,

1999; Tulloch and Sneed, 2000; Kelly, 2001; Newman and Scurry, 2001; Twigg, Innovations, 2001; Tucker, 2001) groups such as the American Association of State Colleges and Universities (AASCU) and the American Federation of Teachers (AFT) continue to deny the reliability of data which suggests that DL programs provide an effective, high quality alternative to conventional courses and programs (Phipps and Merisotis, 1999; Baker and Lucas, 2000; Merisotis and Olsen, 2000).

Weigel (2002) suggests that the importance of the "no significant difference" literature:

> is that the research question has been deemed significant in the first place. Why should one hold up lecture-based classroom education as the benchmark for evaluating new educational delivery systems? If there is no significant difference between distance education and classroom education, advocates of distance education should not trumpet this claim; they should be troubled by it. (p. 31).

One of the most recent, comprehensive reviews of the effectiveness of teaching online is the American Federation of Teachers commissioned review of distance learning research in higher education (Phipps and Merisotis 1999). This study not only questions the validity of distance learning efficacy studies, but also identifies gaps in the research that need to be addressed, including:

- Findings tend to emphasize student outcomes in individual courses rather than for complete academic programs;
- Does not take into account individual differences among students;
- Does not adequately explain high drop-out rates for distance learning students;
- Does not take into account different student learning styles;
- Focuses mostly on individual technologies rather than hybrid models most in use today;
- Does not utilize a theoretical or conceptual framework to provide context for research;
- Does not adequately address the effectiveness of the digital environment within which students must work, including digital libraries. (Institute for Higher Education Policy, 1999, p. 5-6).

In 2000, the U.S. Department of Education Office of the Inspector General conducted a survey in order to identify actions taken or planned by state agencies and accrediting agencies to "provide the necessary oversight to ensure that institutions using distance education methods meet state requirements and education quality standards" (Pilotti, 2000, p. 1). Sixteen accrediting agencies surveyed reported supplementing their requirements and procedures for traditional classroom methods with additional criteria and procedures for educational programs and courses offered through computer transmission. Two accrediting agencies reported that they are developing or reviewing specific requirements for programs and courses offered through computer transmission. In addition, state agencies expressed interest in more extensive or different reviews of educational programs and courses offered primarily through distance education. Accrediting agencies, while suggesting that it is unnecessary to require different or more extensive reviews, agree that review techniques

should be specific and somewhat modified to address distance education methods (Pilotti, 2000, p. 2).
The accrediting agencies and state agencies indicated in the survey that they are highly concerned about the quality of distance education in the following areas (Pilotti, 2000, p. 11):

*Education outcomes
*Curricula
*Availability of information about institution
*Student support services
*Faculty
*Satisfactory academic progress

The level of concern suggests that many agencies and individuals are "frankly suspicious of distance education, believing that distance education programs have either low standards or no standards (Carnevale, February 18, 2000; Twigg, Quality, 2001, p. 3). Some remain skeptical about the impact of DL, viewing its expansion as a "slippery slope – a step toward a weakened and substandard educational system" (University of Manitoba, 2000, p. 1).

Depending upon where they operate and the kind of programs offered, institutions face a variety of regulatory requirements. Each state has legal authority to regulate education within its own borders; thus there are at least 51 different regulatory agencies (including the District of Columbia) with which a distance learning program may have to interact in order to operate within the United States (Bobby and Capone, 2000). Independent institutions are generally regulated by regional accrediting agencies while proprietary schools often fall under the purview of other regulatory bodies. While there are strong reasons for multifaceted controls of education, "they often do not apply in an environment characterized by borderless educational opportunities" (Web Based Education Commission, 2000, p. 89).

Regional accrediting agencies, responsible for multiple states, have begun establishing agreements on best practices pertaining to the evaluation of degree and certification programs delivered via distance learning across jurisdictional lines (Regional Accrediting Commissions, 2000; Regional Accrediting Commissions, Best Practices 2000; Regional Accrediting Commissions, Statement of Commitment, 2001). Under the guidelines, the regional accrediting bodies will offer recommendations for the evaluation of a distance education program by considering a number of factors, including whether faculty members control the creation of content, whether the institution provides technical and program support for both faculty and students, and whether the program has evaluation and assessment methods for measuring student learning (Carnevale, September 8, 2000; Carnevale, April 6, 2001).

Eaton (2002) describes the relationship between higher education and accreditation agencies as a "delicate balance," one which relies on the "government's acceptance of institutional and programmatic accreditation as a reliable affirmation of quality in higher education" (p. 1). She points out that as distance learning activity expands and diversifies, the federal government is turning to accreditation to "affirm that distance learning providers are meeting quality expectations (p. 1).

In December 2000, a report from the federal Web-Based Education Commission (WBEC) focused on a specific set of policy issues in order to better understand the impact of the Web in transforming and improving learning (see Commission Policy Issues, 2001). In particular, the WBEC targeted two regulations concerning financial aid eligibility that currently inhibit the expansion of financial opportunities for DL students: the "12 hour rule" defining full time study as 12 weekly hours of instruction, and the "50 percent rule," which requires that Title IV (of the Higher Education Act of 1965) eligible institutions conduct at least 50 percent of instruction within classrooms (Yanosky, Federal Higher-Ed E-Learning Policy, 2001; Web Based Education Commission, 2000, p. 91-92). While recognizing that both rules help prevent abuse of financial aid programs, the Commission encouraged the identification of "alternatives to current regulation, to assess whether or not they may be more appropriate" than current measures in the DL environment (Web Based Education Commission, 2000, p. 93).

A recent Distance Education Demonstration Project, sponsored by the U.S. Department of Education was authorized to determine the "statutory and regulatory requirements [of Title IV: Student Financial Assistance in distance education programs] that should be altered to provide greater access to distance education programs" (U.S. Department of Education, Office of Post Secondary Education, 2001, Distance Education Demonstration Program, p. 1). A Report presented to Congress in July of 2001, suggests that much more flexibility in rule interpretation is needed "in order to increase access to innovative education programs" (U.S. Department of Education, Office of Post Secondary Education, Student Financial Assistance…, July 2001, p. 12). Reliance on accrediting agencies for quality assurance is considered a given, though the suggestion is made that "the requirements governing accrediting agencies could be expanded to require more oversight of [distance learning programs]…" (U.S. Department of Education, Office of Post Secondary Education, Student Financial Assistance…, July 2001, p. 7).

Two other areas in which the responsibilities of institutions and accrediting agencies are expanding in response to the growth of distance learning are: "protecting students and the public against poor-quality higher education, and attending to quality in the emerging internationalization of higher education" (Eaton, 2002, p. 1). The challenge in using traditional accreditation processes in a DL environment is that "traditional assessment standards have literally required that higher education take place in a physical form. With distance learning, education is not a place, but a process…Accrediting bodies, if they survive at all, will have to become more flexible and focus on educational results" (Smith, 1999).

A statement on "Assuring Quality in Distance Learning" prepared by the Council for Higher Education Accreditation emphasizes as the core for quality assurance three main areas: core curriculum, the role of faculty, and minimum requirements for student involvement (Olsen, Jody K., 2000, p. 2-3; Eaton, 2002, p. 17-18). The statement then identifies eight areas, focused specifically on outcomes: reliable and valid performance measurements for distance learning, substantial evidence of contact between faculty and students, evidence of effective instructional techniques, systematic efforts for selecting and training faculty, availability of learning resources, ongoing monitoring and enhancement of the technology infrastructure,

development of courseware and the availability of verified reliable information, and examination of alternatives to the traditional accreditation process (Eaton, 2002, p. 18-20).

An excellent summary of quality assurance and evaluation instruments in the DL environment has been prepared by St. Petersburg Junior College in 2000 (St. Petersburg Junior College, 2000). For example, both the American Council on Education and the Western Cooperative for Educational Telecommunications are listed on the St. Petersburg list. They have developed documents to help institutions and accrediting agencies evaluate distance learning based on outcomes rather than traditional input measures (American Council on Education, 1996; Western Cooperative for Educational Telecommunications, 1996). The Western Cooperative for Education Telecommunications "Principles of Good Practice in Electronically Offered Higher Education and Certificate Programs," developed under the auspices of the U.S. Department of Education Fund for the Improvement of Postsecondary Education in 1995, has been accepted by higher education regional accrediting associations, including North Central Association, The Southern Regional Education Board, and the Western Interstate Commission for Higher Education, as a starting place for their work in developing guidelines to identify best practices in distance learning programs (Western Cooperative for Educational Telecommunications, 1995; Krauth, 1996; Southern Regional Education Board, 2000-2001; Oakley, 2002).

Some individual states have developed their own guiding principles. The Indiana Partnership for Statewide Education "Guiding Principles for Faculty in Distance Learning" is a case in point (Indiana Partnership, 2000). Individual institutions have also developed guiding principles that promote best practice for the integration of distance learning into the existing university framework. Penn State (Penn State, 1995-1998) and the Virginia Community College System (Virginia Community College System, 2000) are examples of institutional statements that provide assurance that the quality of technology-based asynchronous distance learning will be comparable to learning in traditional classroom settings.

One international set of accreditation guidelines is also worth noting. The Quality Assurance Agency for Higher Education, in the United Kingdom, has produced an extensive set of guidelines for quality assurance in distance learning. Through an extensive series of questions, the guidelines "help institutions check the soundness of their arrangements" in "system design, programmer [sic] design and delivery, student development and support, student communication and representation, and student assessment" (Quality Assurance Agency, n.d., p. 2). It is noteworthy that the emphasis of these British guidelines is almost exclusively on students, while guidelines created in the U.S. have a very large emphasis on faculty issues.

Private organizations in the U.S. are also participating in the process of identifying best practices in the DL environment. In 2000, the National Education Association, in cooperation with Blackboard, Inc, published a report which identifies 24 quality measures or benchmarks "for success in internet-based distance education" (Institute for Higher Education Policy, March, 2000; Institute for Higher Education Policy, April, 2000; National Education Association and Blackboard, Inc., 2000). Separately, both the National Education Association (NEA) (1998) and the American Federation of Teachers (AFT)

(2000) have issued statements, which call on colleges and collective bargaining agreements to adopt standards, identified in the AFT statement, that ensure the quality of distance education (American Federation of Teachers, 2000). The American Distance Learning Association (ADEC) published its "Guiding Principles for Distance Learning" in 2001 (American Distance Learning Association, 2001). The American Council on Education has also published a set of guidelines through its Center for Adult Learning. "These principles are not a treatise of 'how-to' for institutions, organizations, or learners. Rather, they make a statement designed to address the qualities that should characterize the learning society in the years ahead" (American Council on Education, 1996). Most recently, the Sloan Consortium has developed and posted on its website a "A Quality Framework" as a way of promoting the quality of online programs in higher education. Specific structures, called the "five pillars of quality" -- student satisfaction, access, learning effectiveness, faculty satisfaction and cost effectiveness, are to be "understood and applied by each institution as appropriate…" (Sloan Consortium, 2002).

An interesting new development comes in the form of an announcement from the Benjamin Franklin Institute of Global Education. In October of 2001, the Institute announced its Distance Education Quality Assurance Program (DEQA), which is coming in the form of a "support package for educational institutes and departments to enable them to develop and implement a Quality Management System to the ISO 9001-2000 standard, leading to successful registration as an ISO-certified body" (Hibbs, 2001).

Mendenhall (2001) suggests that new models for assuring quality and credentialing learning will be necessary as the DL environment continues to expand.

> Perhaps the most important impact of the Internet on education is that it transfers authority from learning institutions to individuals. This trend, at least for adult learners, will lead to some surprising consequences.
>
> - Individualized education will lead to individualized accreditation or certification of learning achieved…
> - There will be a greatly increased need for, and acceptance of, competency-based certifications rather than traditional grades on transcripts…
> - In the end, if students can define, obtain and validate their own learning, and employers find the validation reliable, then the meaning and value of a college degree is redefined (p. 6-7).

The challenge faced by those in the DL environment to validate their learning,

> though difficult, is not impossible. As online pedagogy develops, it is replacing tests with portfolios, individual grades with group projects, and single assignments with iterative projects that require revision and re-thinking. When distance education finishes implementing outcome measures of learning for its programs, the rest of higher education will have no choice but to follow suit (Klonoski, 2002, p. 3).

The Cost of Distance Learning Technology

The motivation for establishing methodologies for assessing the cost of distance learning is fueled by the desire to reach more learners while at the same time responding to the pressure to reduce costs, increase efficiency, and maintain high quality (Fahy, 1998; Ash, 2000). There are now many references in the literature to the potential for cost savings and return on investment as one of the benefits of distance learning (McClure, 1997; Kaganoff, 1998; Baer, 1998; Twigg, Improving Learning, 1999; President's Information Technology Advisory Committee, 2001, Rumble, 2001).

In theory, reducing costs as distance learning opportunities expand may be possible. Many writers are not convinced, however.

> …all the talk of using technology to 'save money by increasing productivity' has a hollow ring in the ears of the budget officer who has to pay for the salaries of a cadre of support staff, more and more equipment, and new software licenses--and who sees few offsetting savings (Bowen, 2000, p. 24).

A 1996 study prepared for the European Association of Distance Teaching Universities showed that "creating a distance-learning program involves so many variables--from program type and size to the source and cost of course materials that building revenues while cutting expenses is merely a possibility, not a certainty" (Zollinger, 1998, p. 10). The fact that conclusive reliable results of cost-benefit studies are not being found suggests that no one yet has succeeded. Many methodologies attempt to "marry" costs and benefits together; separate methodologies for measuring costs and effectiveness are applied, and then the two are bonded together "with the educational equivalent of sticky-tape" (Ash, 2000).

What is cost-effectiveness?

Cost-effectiveness "is a mode of cost-aware institutional operation, which takes into account quality and benefits to all stakeholders, and allows comparisons with similar institutions to be drawn" (Ash, 2000). Cunningham et al. (1998) point out that there is no agreement in the literature on the definition of 'benefits' (p. 132). Jones and Simonson (1990-91) suggest that DL is beneficial when effectiveness is measured by achievement, by attitudes of students and teachers, and by cost-effectiveness. Daniel (1998) suggests that cost effectiveness is "making learning productive" so that "more students can complete their courses and programmers [sic]" at a lower per-head cost (p. 40).

McArthur and Lewis (1998) suggest that cost-benefit relates to a number of variables including reducing teaching costs, increasing the speed with which learners acquire knowledge, as well as improving the quality of learning. They identify a collection of cases in current practice that suggest that some technologies do represent reduction in DL costs and increased productivity (chapter 2, Figure 2.1). They point to the Open University in Great

Britain as an example of achieving cost reductions by increasing student/faculty ratios, lowering labor costs, and lowering the development and technology costs per student (chapter 2, p. 3).

Daniel (1998) suggests that there is the potential for "superior cost-effectiveness" in the operation of what he calls mega-universities (p. 39-40). A mega-university is "a distance-teaching institution with over 100,000 active students in degree-level courses" (Daniel, 1998, p. 29). Their goal is to operate at low cost per enrolled student. He points to research on the Open University, and other mega-universities in France and China, as examples of institutions that have dramatically lowered the average cost per student over that of conventional universities (p. 39).

Much more modest examples of cost-effective strategies come out of the literature on American efforts to reduce costs and increase benefits in the DL environment. For example, Robinson (2001) suggests that distance learning materials must be used as many times as possible to maximize the return on investment. Kaludis and Stine (2000) suggest that the management of costs will be accomplished through the scaling and replication of content. Twigg (1999) discusses an on-going program, the Pew Grant Program in Course Redesign, which focuses on increased individualized instruction, increased enrollment in individual course sections, and lowered costs of delivery.

The Andrew W. Mellon Foundation (1998) reports on a technology assessment project which attempts to measure the enhancement of learning in cost-effective ways. While not totally focused on distance learning, the initiative raises important questions and concerns that have the capacity to influence developments in the DL environment. These include:

> Can human resources be deployed more effectively by using technology to serve more students? …
> Can several campuses share scarce specialized talents in some subject matters? …
> Can some faculty time be redeployed by making better use of time faculty spend [teaching?] What activities are better done outside [rather] than inside the classroom? (Andrew W. Mellon Foundation, 1998, p. 2).

So far, findings from the series of studies sponsored by Mellon suggest that approaches to costing now in use "largely reflect untested assumptions about the ways universities work… Given different approaches and very different assumptions, there may be considerable extra difficulties in extracting the requisite costing data from the institution's records" (Fisher and Nygren, 2000, p. 7).

Cunningham et al. (1998) show that there is no consistency in cost assessment terminology or methodologies in the existing literature. For example, the Flashlight Program has its own Cost Analysis Handbook for comparing costs of distance learning and on-campus courses (need citation, Geith and Cometa, 1999; Rochester Institute of Technology, n.d.). Frank Jewett of the California State University system directed a cost-benefit study in 1996 and developed a free simulation model called BRIDGE for cost analysis (Jewett, 1996). "Bridge is designed to help people think about some of the basic costs involved with shifting from

traditional, labor-intensive models of instruction to approaches that are more capital (materials) intensive, e.g., centralized course design, multiple sections" (Studies of Costs, 2002). The manual and related materials can be found at www.wiche.edu/telecom/projects/tcm/index.htm.

The Sloan Center for Asynchronous Learning Environments (SCALE), established in 1995 at the University of Illinois, developed a productivity model for measuring the costs of delivery of asynchronous courses. It includes in its model factors for measuring faculty costs, programming costs, and equipment costs. It looks at all measures in "dollar terms to best make comparisons between the various cost components" (Arvan, et al., 1998, p. 6).

The COSTS Project, led by Karen Leach and David Smallen, looks at the cost of support services for information technology in small liberal arts colleges (Leach and Smallen, 1998). Like the Mellon grant program, this project, while not directly focused on DL, provides data that can be used in the DL environment. Morgan has developed his own interactive worksheet and costing tool, which allows users to generate an estimate of costs associated with online courses (Morgan, 2000, 2001; see also www.marshall,edu/distance/). The Western Cooperative for Educational Telecommunications (WCET), with funding from the Fund for the Improvement of Postsecondary Education (FIPSE), has developed its Technology Costing Model (TCM), to

> a) analyze the costs of instructional approaches that make heavy use of technology; and b) to legitimately compare cost data for different instructional approaches. TCM is not a cost/benefit analysis. Since definitions of "quality and "benefits" vary widely, these determinations are left to the campus" (Jones, 2001, p. ii).

The TCM project, first focusing on the western states belonging to the Western Interstate Commission on Higher Education (WICHE), has in its second round of studies taken on a national focus (Jones, 2000). Taylor et al. (2001) describe a cost versus price template process utilized at one university, Texas A&M.

Rumble (2001, 2002) argues that all of these efforts have limited value. There is lack of agreement on the costs that should be taken into account. This is particularly true with regards to "hidden costs" -- staff consumables costs, overtime and development time, for example (Bacsich and Ash, 1999; Marchmont Observatory, 2000). Different studies use different terminology, reflecting "jurisdictional and linguistic differences in terminology, local institutional practice and personal preferences." They categorize costs in different ways and "apply a variety of frameworks to give coherence to their work" (Rumble, 2001). For example, Rumble (2002) and Jurich (2000) show that distance education may have a lower cost per student than traditional approaches, but as dropout rates tend to be higher in distance education, the average cost per graduate tends to be higher. Sandmann (2001) assesses a set of six DL cost studies commissioned by the Alfred P. Sloan Foundation. She shows that "researchers approached the cost issue in strikingly different ways... [and] program assessment is dependent on how cost and revenues are defined."

However costs are defined, Gartner Research reports that more than 90 percent of higher education respondents surveyed in the year 2000 reported that DL cost as much or more to deliver than traditional classroom offerings. However, when asked if their institution had a financial model for DL, more than half said no. (Zastrocky and Harris, "Financial Model," 2000.) Gartner recommends that "institutions planning for distributed learning programs must build a strategic plan that includes a realistic financial model" (Zastrocky and Harris, "Financial Model," 2000).

Suggested financial models for distributed learning are appearing in the literature (Ash, 2000; Marchmont Observatory, 2000). Karelis (1999) looks at four possible models for funding, emphasizing the "crucial intersection point where traditional classroom costs begin to exceed the costs of IT implementation" (Daniel and Cox, 2002). Karelis emphasizes, however, a "yet unsolved problem: the crossover point of the two delivery systems generally falls to the right of what I am going to call the "scale barrier," or the current practical upper limit on the number of student enrollments" (Karelis, 1999). He suggests a low marginal cost Web-based teaching model, which relies on peer instructors for "answering student questions and leading small group discussions…rather than by graduate teaching assistants or implementation specialists" as a solution to this problem.

Tony Bates, Director of Distance Education and Technology at the University of British Columbia, provides a comprehensive review of financial models for supporting DL. He presents a range of alternative funding strategies, presents pros and cons for each strategy considered, and concludes:

> the costs for online learning are different from those for face-face-teaching. In particular, the ratio between direct and indirect costs seems to vary considerably between the two forms of teaching. More research and better costing methodologies that take into account direct and indirect costs are needed…funding strategies specifically to support online learning need to be developed (Bates, 2000, p. 27).

Saba (2002) points out that "higher education is one of the rare institutions in which adoption of technology has not reduced the cost per people served. The basic organizational structure of the university has remained the same. "Simply put, the organizational structure of most of the institutions of higher education is prohibiting them" from benefiting from information technology (Saba, 2002). Twigg (Innovations, 2001) points out that the issue of increased costs is directly related to that of access. She points out that "it is very difficult for most existing institutions to expand access, whether on campus or online, without facing significant budget increases" (p. 23).

How can this situation be managed? How can distributed learning be used as a catalyst to stimulate institutional transformation and at the same time hold the line on significantly increased costs? The final section of this paper will attempt to answer these questions.

Section 4: Institutional Transformation

In 1996, Sherry completed a major review of the professional and research literature related to distance learning. The issues she identified through her review fall into six major areas that define the distance learning environment: organizational arrangements, course design considerations, methods and strategies for instructional delivery, aims and goals of distance learners, operational issues, and management and policy issues (Sherry, 1996). This monograph identifies issues related to all of these categories, except the last. It is in the area of management and policy that I want to consider in summing up the challenges universities are facing as they attempt to overcome the barriers and face the possibilities presented by the distributed learning environment.

Five recent major analyses have summarized policy issues in the DL environment and their implications for decision makers. McClure (1997) describes nine "organizational resistance to change" barriers that impact the ability of higher education institutions to set policy and be transformed by distance learning. The Southern Regional Education Board established its Distance Learning Policy Laboratory (DLPL) in 1999 and identified seven areas in which policies and standards of good practice need to be developed in order to reduce or eliminate existing or potential barriers to distance learning activities. These include: transfer of credit; faculty development, assessment, compensation, productivity/workload, and ownership/copyright; financing and new funding strategies for DL; financial aid issues; quality assurance; student services; and reaching the underserved (Partlow and Lavagnino, 2001; Chaloux, 2002). Gellman-Danley and Fetzner (1998) identify seven policy areas that represent "bureaucratic problems and roadblocks." King et al. (2000) provide a policy analysis framework which "identifies for decision makers essential, large policy areas…as well as particular activities in each area." Johnson and DeSpain (2001) conducted a survey in order to identify the "specific issues…of interest and/or concern in the implementation of distance learning models." Survey results show that although distance education is now an integral part of the institutional life for the respondents, policy issues related to copyright, ownership of course materials and compensation have yet to be addressed.

Faculty teaching, learning, and rewards

Building awareness of the policies needed to support the variety of roles played by DL faculty can be done by reviewing a number of published articles. These articles discuss emerging faculty roles in the DL environment (Gibbons and Wentworth, 2001; Newman and Scurry, 2001; Olcott, 2000; Shotsberger, 1997). A useful classification of faculty roles is reported in Cornelius and Higgison (2000). They cite Berge (1995), Collins and Berge (1996), Harasim et al., (1997), and Salmon (2000) in creating the classification scheme highlighted in Figure 23 below.

An important consideration is to assess whether the full range of roles can actually be provided by a single instructor (Cornelius and Higgison, 2000, chapter 2, p. 8). The variety of roles reflected in Figure 23 above may be split between two or more specialists, including

subject specialist and learner support specialist, or distributed to a "support team" made up content specialists, multimedia developers, graphic designers, instructor, and technical coordinator. These shared responsibilities challenge the traditional gatekeeper role of faculty members as purveyors of the content and process of learning (Jurich, 2000). Gifford et al. put it this way: The most formidable obstacle in helping faculty move into a distributed learning environment is the "primacy of local decision making" (Gifford, et al., 1999, p. 19). It follows that a *university* effort to move faculty into a new teaching and learning roles, in which faculty serve on teams to develop and deliver DL courses, is difficult to develop and sustain.

Figure 23:
Classifications of the Roles of a
Faculty Member in the DL Environment

Cornelius and Higgison 2001	**Berge 1995**	**Harasim, Hiltz, Telles and Turoff 1997**	**Collins and Berge 1996**	**Salmon 2000**
Technologist	Technical		Firefighter	
Manager	Managerial	Planner	Administrator	
Co-learner	Pedagogical		Participant	Information giving and receiving
Designer		Group structurer		Developer
Knowledge expert				Knowledge construction
Researcher				
Facilitator		Facilitator	Facilitator	Access and motivation
Advisor	Social	Guide	Promoter	Socialization
Instructor			Helper	
Mentor				

Adapted from Cornelius and Higgison, 2000, chapter 2

Betts (1998) summarizes ten factors that motivate faculty to participate in DL programs:

> 1) intellectual challenge; 2) personal motivation to use technology; 3) ability to reach new audiences that cannot attend classes on campus; 4) opportunity to develop new ideas; 5) technical support provided by the institution; 6) overall job satisfaction; 7) opportunity to diversify program offerings; 8) opportunity to improve teaching; 9) increase in salary and 10) greater course flexibility for students.

Assuming that a university does have faculty members who are motivated to work with staff to build and deliver DL courses, there are a number of issues related to the development and use of course content. McArthur and Lewis (1998) suggest that "if universities encourage faculty to build online courses that adhere to emerging Web-document standards, they will be

inviting the sharing of course products" (chapter 6, p. 10). The culture of sharing faces several threats. Issues of copyright and intellectual property rights are being reexamined in light of the introduction of electronic course materials into the higher education mix. Two issues, the acquiring and using of copyrighted digital materials, with appropriate compensation for copyright holders, as well as assigning of ownership and control of digital materials created in-house, frame the basis of discussion in this area (Care and Scanlan, 2001; Dallas Teleconferences, 2001; Harris, 2001; Oblinger, et al., 2001; Rhoades, 2001; National Research Council, 2000; Twigg, Who Owns Online Courses, 2000).

The free flow of information is "perhaps the biggest issue higher-education institutions will have to face in the near future" (McArthur and Lewis, 1998, chapter 6, p. 14). In June 2001, the U.S. Senate passed Senate Bill 487, The Technology, Education and Copyright (TEACH) Act and sent it to the U.S. House of Representatives for passage (MacMillen, 2001). Unfortunately, due to the events of September 11, 2001, it is still languishing in the House. In spite of bipartisan support, the measure was put off as the Judiciary Committee redirected its resources to more pressing needs (Guerard, 2001). The bill addresses shortcomings in the existing copyright law that limit copyright exemptions in distance learning courses to "transmissions designed for reception in classrooms or similar places normally devoted to instruction" (Yanosky, E-Learning Law, 2001, p. 1). The bill is "sorely needed, as licensing fees for the use of copyrighted materials threaten to undermine the growth of distance-education programs" (Guerard, 2001).

Betts (1998) identifies ten factors that "would inhibit" faculty from participating in distance education programs. These include:

1) lack of technical support provided by the institution; 2) concern about faculty workload; 3) lack of release time; 4) concern about quality of courses; 5) lack of grants for materials/expenses; 6) lack of distance education training provided by institution; 7) lack of monetary support for participation (stipend, overload); 8) concern about quality of students; 9) lack of merit pay; and 10) lack of support and encouragement from dean or chair.

Other obstacles to the adoption of the DL model by faculty are highlighted by Gifford et al. (1999). They include the pedagogical belief that the lecture-presentation method is the "normative teaching method." This belief rationalizes "the placement of faculty at the front and center of the contemporary college classroom, initiating, orchestrating and regulating student information exchanges and interactions" (Gifford, et al. 1999, p. 19). New approaches to teaching and learning, supported by technologically-enhanced content, standardized and reusable, for dissemination via distance learning, can thus be seen as problematic from a faculty member's perspective. The American Federation of Teachers refers to skeptics who cite a variety of concerns, including "whether deep understanding of difficult material--beyond amassing facts--can occur in the absence of same-time same-place interaction" (American Federation of Teachers, 2000, p. 5). McClure (1997) suggests that this concern relates to the perception that "teachers are not in control in quite the same way they were in the past when the class assembles at a certain time with the teacher in front of the classroom, choosing the domain under which they interacted." Nobel, for example,

refers to this issue as the "automation and deprofessionalization" of university instruction (Noble, 2001, p. 30).

Another barrier is the assumption, supported by policy, that the current academic calendar is the best way for scheduling instruction. "Closely linked to this belief is the assumption that the opportunity to learn is equivalent" to seat time in class (Gifford et al. 1999, p. 19). Quality is equated with courses and degree programs offered *on a campus* (emphasis mine) (Twigg, Quality Assurance, 2001).

Associated with seat time and residency is the issue of faculty workload. Campuses generally define faculty workload in terms of the number of courses taught per semester on a campus.

> But if a campus is offering a distributed learning course that is not tied to any specific enrollment time periods, how should the institution define the course?...If a course cannot be defined, it is impossible to define workload in the traditional manner, thus opening up a plethora of issues. How does an institution determine a faculty member's compensation if a full load of work has not been adequately defined? (Hawkins, 1999)

In 2001, universities in Northeast Ohio participated in a survey on "workload and compensation issues related to distance learning" (Mapley, 2001). This survey

> shows that faculty effort involved in teaching distance learning courses may differ little from traditional instruction or may require a multi-fold increase in effort…Many of the activities associated with "distance learning" are also used with traditional "on-site" instruction…Is "distance" the key to extra workload and compensation, or is the preparation of ancillary materials the key? In determining supplemental workload and/or compensation, are outcomes to be considered or only effort? Does the preparation of massive ancillary materials with little education impact provide more justification for additional workload than the creation of "chalk and talk" presentations that effect significant educational outcomes? (Mapley, 2001, p. 1)

Questions like these require serious consideration and may involve new policy formulation or revision of existing policies in areas such as class size, compensation, development incentives, assignment of full time or adjunct faculty, faculty shared among institutions, and office hours (Oblinger et al., 2001; Gellman-Danley and Fetzner, 1998).

Institutional issues

Boggs (1999) suggests that faculty members who question ideas related to new teaching and learning roles in the distributed learning environment do not understand that ideas about "the new learning paradigm" need to be focused on the institutional level rather than at the individual faculty level.

> There are four important tenets of the learning paradigm. First, the mission of colleges and universities should be student learning rather than teaching and instruction. Second, institutions should accept responsibility for student learning. Third, supporting and promoting student learning should be everyone's job and should guide institutional decisions. Fourth, institutions should judge their effectiveness and be evaluated on student learning outcomes rather than on resources or processes. (Boggs, 1999)

The Advisory Committee for Online Learning, on behalf of Industry Canada, has examined institutional barriers to increased support of on-line learning in higher education (Industry Canada, Models and Strategies, 2001). The Committee surveyed 815 education administrators and managers, and found that five of the top barriers are

> directly related to social or political issues within the educational institution. [They are:]
>
> Organizational resistance to change
> Lack of shared vision for distance education in the organization
> Lack of strategic planning for distance education
> Slow place of implementation
>
> Overcoming these barriers are challenges not to technology, nor directly to financial concerns, but rather speak to the need for visionary leadership and accompanying educational policy reform (p. 3).

Many DL studies bemoan the reluctance of academics to embrace both technology and distance learning. Oblinger et al. (2001) suggest that faculty members are apprehensive about distributed education, fearing that education will be depersonalized or that they will be replaced. "In consensus-based institutions, the inability to address faculty concerns or the lack of faculty buy-in cannot only stall a distributed education initiative but also can be career-threatening to the administrator who promotes them" (p. 25). Jurich (2000) refers to faculty "fear of technology." The National Education Association survey of traditional and distance learning higher education members finds that faculty's zest for distance learning (three quarters of those surveyed are positively disposed to try distance learning) is "tinged with some apprehension about the future" (National Educational Association, "Faculty Weigh in…," 2000; National Education Association, A Survey, 2000).

Many faculty, of course, are experimenting with DL, but many also believe "it is the function of a university to question, to caution, to reflect on the nature of change, and to preserve as well as extend knowledge across discipline areas" (Cunningham et al., 1997, p. 162). Zastrocky and Yanosky (2001) review the classical idea of "university" and argue that college and universities are well-placed to support basic principles not addressed by other educational forms. These include the support of a broad teaching curriculum, research and community service. They raise the provocative question: "Do these technologies [i.e. use of the Internet and the web, online student services, etc.] really change the idea of the university?" and answer by stating "we do not believe that the 'death of distance' or other technologies so far suggest the melting away of the university's distinctive roles…." They

support this observation by reporting on findings from a Gartner Research study that shows that

> respondents reported higher student graduation and completion rates in DL courses when online instruction was conducted by traditional departments rather than separate, specialized DL units -- suggesting that direct faculty contact remains a key component of student success" (Zastrocky and Yanosky, 2001).

For the majority of educational institutions, i.e., those whose missions are not specifically dedicated to distance learning, the emergence of asynchronous methods of course delivery presents these institutions with major challenges related to both technological and organizational change (Facemyer, 1997; Foster; 2002; Klonoski, 2002; Jurich, 2000; Hawkins, 1999; Bates, 1997; Kovel-Jarboe, 1996). Strategies for institutional decision making related to the DL concept are being developed to help "steer" institutions "through the rapids" of transformation (Cookson, 2000; Norris and Olson, 1997). See for example the Distributed Education Decision Matrix developed by the University of Alberta (University of Alberta, n.d.).

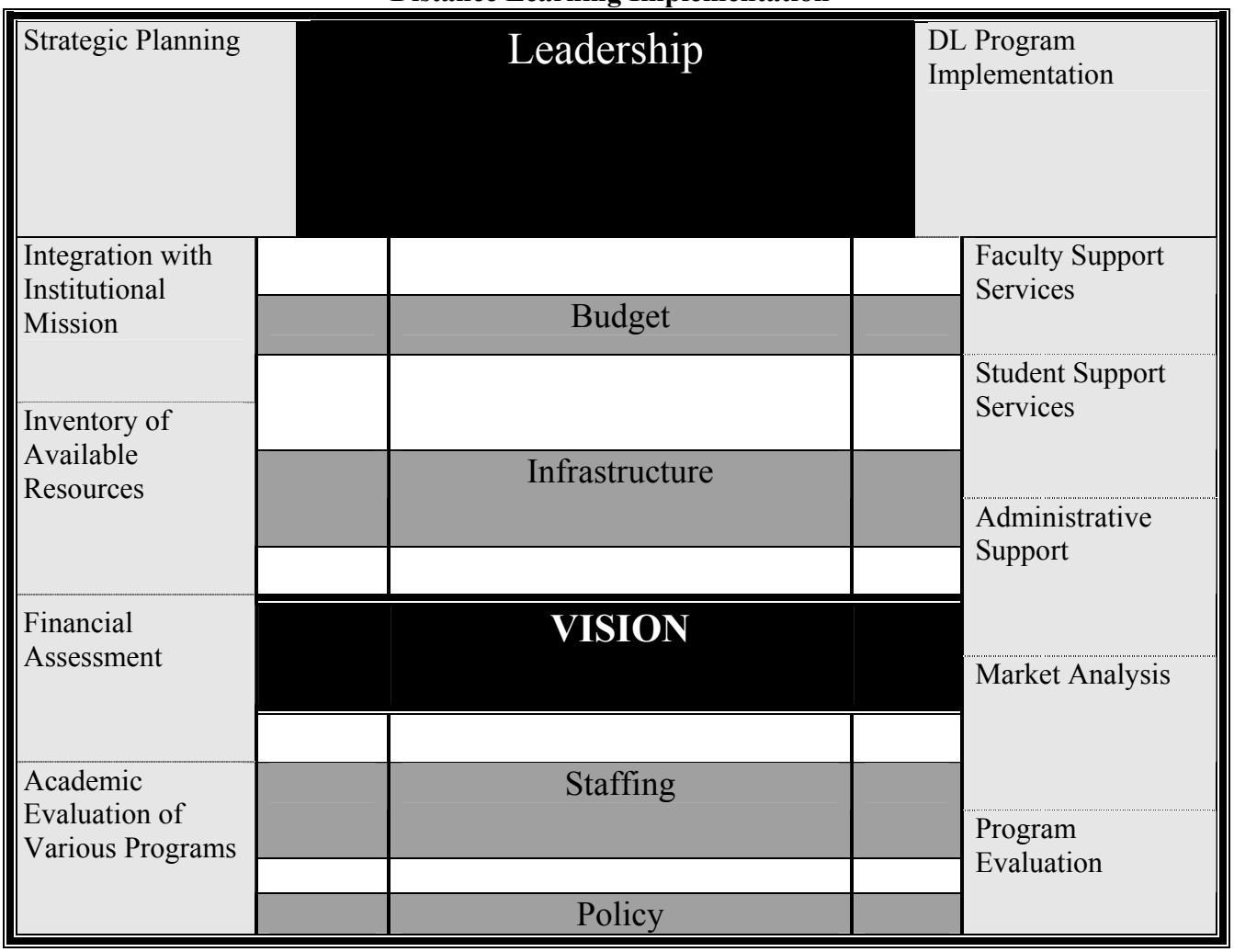
See also the strategic planning framework developed by Berge and Schrum (1998) below. The process represented here is proposed to help higher education institutions "to integrate technologically enhanced learning at a distance" into "routine strategic planning for the institution," so that "decision making intrinsically links to smooth implementation of technology-enhance learning."

A good metric for change or development means that those higher education institutions committed to distribute learning will plan for and support new organizational features to support goals related to DL, or old organizational elements will be repurposed toward these new goals (Facemyer, 1997). Many colleges and universities have already launched major strategic efforts to understand, be responsive to and be transformed by their response to DL issues. See for example Stanford University's statement of "Institutional Approaches to Distance Learning: Affirmation of Principles" (Young, December 7, 2001) and Brown University's Provost's statement on "New Technologies, Distance Learning and Brown University" (Brown University Office of the Provost, n.d.).

Yet, as Duderstadt (1999) points out,

> such efforts to explore new models of learning extend far beyond the traditional higher education enterprise to include an array of new participants, including publishing houses…entertainment companies, information services provides,…and information technology corporations. It is clear that access to advanced learning opportunities is not only becoming a more pervasive need, but could well become a defining domestic policy issue for a knowledge-driven society (Duderstadt, 1999).

Figure 24: Linking Institutional Strategic Planning to Distance Learning Implementation



Adapted from Berge and Schrum, 1998.

Hawkins (2000) predicts that residential campuses will continue to have a significant role to play in the future However he sees an erosion of traditional markets as "profitable" popular, low-overhead programs become the purview of proprietary programs as well (see Symonds, 2001). "If a proprietary program, such as an asynchronous business program, begins to erode the enrollments of a given institution's residential program, it will also negatively affect the cross-subsidized economics of other disciplinary units."

Some institutions are continuing to develop and support their own distributed learning environments." Although economics and politics were early drivers, peer pressure and changing customer expectations have become increasingly important" motivators in this regard (Zastrocky and Harris, March 16, 2000, p. 2; see also Wheeler, 2002). Gartner Research predicts that "economic and political pressure and competition will force

educational providers to deliver more than 75 percent of their educational programs and content electronically by 2005 (Zastrocky and Harris, March 16, 2000, p. 2).

The cost and complexity of individually-developed and maintained DL structures "will almost certainly serve as a significant barrier to individualized solutions" to DL program development and delivery in the future (Hawkins, 2000). Yet, the focus on individualized solutions still predominates, as this literature review confirms. Perhaps the most important lesson this author has derived from completing this "state of the art" assessment of distributed learning is that the capacity of technology to transform education by shaping traditional teaching and learning models has fallen well short of its promise. The tendency in higher education is to "fit" technology into traditional university structures and use it to deliver education in traditional ways rather than to use technology as a change lever to help create new teaching and learning paradigms (Olcott, 2000). This situation is leading to the development of innovative learning venues outside of the boundaries of traditional U.S. higher education (Naidoo, 2001). Concepts of "virtual campuses" or "borderless education" with their vision of learning integration--students in the classroom, in the home, in the community learning center and in the work place, all meeting or communicating, through technological links, without regard to local, state or even national boundaries are fast becoming reality (see Cunningham et al. 1998; Pollock and Cornford, 2000; Thompson, et al., 2000; BENVIC, 2002). Many of the most outstanding examples are found outside of the U.S. (See for example a description of the Open University of Catalonia based in Barcelona, Spain in Thompson, et al., 2000, Annex 1; see also Swinton, 2002).

Section 5: Concluding Remarks: A Snapshot of Ohio

This concluding section seeks to briefly synthesize the most pertinent issues for institutions in Ohio that are already participating or who may wish to "play" in the DL environment in the future. It is important to keep in mind that the issues identified in this section are subject to continuous change within the higher education environment as it is forced to respond to competition, funding crises, relationships within and outside of Ohio, and copyright and intellectual property policies. All of these issues are already affecting higher education decision making in Ohio.

The analysis is presented in grid form, with items classified as high, medium or low relative to strengths, weaknesses, opportunities or threats.

Figure 25: An Analysis of DL Strengths, Weaknesses, Opportunities and Threats in Higher Education in Ohio

Level	Strengths	Weaknesses	Opportunities	Threats
High	Institutional credibility. Existing distance programs. State technology infrastructure. OhioLink.	Fragmented, decentralized approach to DL development in the state. Funding and subsidy regulations. Competition among higher education providers. Redundant infrastructure.	Ohio Learning Network.	Out of state DL providers coming into the state.
Medium	Responsiveness of higher education to perceived needs.	Institutional inexperience in supporting large DL efforts. Lack of strategic planning for DL.	Collaboration with k-12. Collaboration with business and industry.	Higher education sees threats where there may be opportunities.
Low	Large number and variety of higher education institutions in the state.	Copyright/intellectual property regulations.	Collaboration with other higher education institutions out of state.	"Corporate" agenda in higher education.

This grid represents many of the issues discussed throughout this paper. Ultimately, Ohio higher education institutions must clarify precisely what their commitment to DL should be, particularly in relation to serving both traditional students as well as lifelong learners. They must determine how they can best leverage the DL expertise that exists in the state; they must

determine what kind of role the Ohio Learning Network should play in this effort; they must determine optimum delivery modes; they must identify the competition and respond appropriately to it; and, finally they must determine how the infrastructure should be leveraged for maximum utilization.

For the state, the key questions are how to encourage new models of higher education provision, while also providing appropriate quality assurance of DL offerings. In responding to these questions, state leaders also need to determine how best to direct investments that will encourage Ohio to creatively manage DL efforts in the future.

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